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# THE LONDON NATURALIST

the journal of the  
LONDON NATURAL HISTORY SOCIETY

## No 57

Published September 1978  
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# LONDON NATURAL HISTORY SOCIETY

The Society welcomes new members, both beginners and experts. Its Area lies within a 32 km (20-mile) radius of St Paul's Cathedral and here most of its activities take place. Although much is covered with bricks and mortar, it is an exciting region with an astonishing variety of flora and fauna. The Society consists of sections whose meetings are open to all members without formality. For those interested in archaeology, botany, conservation, ecology, entomology, geology, ornithology or rambling there is a section ready to help.

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**No. 57**  
for the year 1977

Edited by J. R. Laundon  
with the assistance of  
R. M. Burton and K. H. Hyatt

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Effects of Dutch elm disease. Almost all elm *Ulmus* trees in the London Area are now dead or dying, and many have been felled. This slaughter is caused by the fungus *Ceratocystis ulmi* transmitted by the bark beetle *Scolytus*. Picturesque arboreal landscapes are everywhere devastated to treeless wastes. The top picture shows the elms on Llanthony Road Green, Morden (London Borough of Merton), in 1973, when a few displayed the first overt symptoms, leaves turning brown on some branches. The lower picture is from the same viewpoint in 1977 after all the elms had died, leaving a solitary oak. Despite the impact of the disease, there is a lamentable lack of studies of its effects on ecosystems. Photographs: J. R. Laundon.



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## Report of the Society for 1977\*

This has been a relatively quiet year—although as usual, much work and thought has gone into the running of the Society. The main event of the year has been the publication of the *Atlas of Breeding Birds of the London Area*—a labour of love by the authors over many years. This is an excellent example of the type of work which should be undertaken by the Society with its many fields of interest. We thank D. J. Montier and his colleagues for their efforts.

The programme has had a full complement of events, thanks to the efforts of the various organising committees. Many of the meetings could receive better attendance; and it is the support from the members that ultimately decides on the quality of the meetings. By way of experiment, we are seeking out new venues which could prove more favourable. The symposium for 1976 was again successful. Tony Hutson, after now completing his third symposium, wishes to stand down. We thank him for all his work in giving us these annual events.

The editorship of the *Newsletter* has passed to P. Clement, and that of the *Ornithological Bulletin* to M. J. Spicer. They, with R. Softly and his team, have worked hard to give us these bonuses. We thank them warmly.

Don Burchfield has decided to stand down as Treasurer through personal pressures. We thank him for all his gallant efforts—especially over a demanding period.

Membership has increased slightly, but it is worrying that there should be such a large turnover of members. We welcome the newcomers; we hope they will enjoy their membership and contribute in making the Society an important one. Membership figures are:

	1976	1977
Ordinary members	919	981
Subscriber members	16	19
Family members	85	91
Junior members	60	52
Senior members	42	44
Honorary members	16	16
Life members	13	13
Total	1,151	1,216

We learn, with regret, of the deaths of Mr L. Roberts and Mr W. Warren.

We thank, as usual, Imperial College for allowing us the use of their rooms for our meetings; and especially Mr Whitworth and his staff for the custody of our Library. In concluding, Council expresses its gratitude to all those concerned in making the Society an important and entertaining one.



## Post-glacial Deposits at Stanstead Abbots

by KEVIN A. ROBERTS\* and PAMELA L. E. ROBERTS\*

### Introduction

During the course of gravel extraction near the confluence of the Rivers Lee and Stort on the Hertfordshire/Essex border peat-filled shallow depressions and deeper channels were noted in the surface of the gravel deposits, beneath a capping of silty clay. The site lies in the parish of Stanstead Abbots in Hertfordshire, grid reference TL 400106.

Several bones were found by Tony and Robert Aberdein on mounds of overburden beside a pit. Further examination showed that many bones were present in the mounds, which consisted of a mixture of clay, peat and gravel. Closer examination of one end of the pit revealed the presence of a deep channel incised into the gravel and infilled with peat. A rapid preliminary excavation of these stratified deposits was undertaken in 1976, but this was curtailed by the grading of all the pit sides. Small areas of deposits, now concealed by landscaping, remain undisturbed between the gravel-pits.

### The Peat Section

The infilled channel exposed in the side of the pit (Fig. 1) was covered to a depth of 115 cm by soil and silty clay. Beneath this soil the upper part of the channel was filled with peat 88 cm thick, with many tree roots, trunks and branches. Alder *Alnus glutinosa* cones, a hazel *Corylus avellana* nut and fruits of *Carex* were also found. Parts of trees other than roots were absent from a section 33 cm thick in the middle of this upper peat, and the tree trunks immediately below showed ends reminiscent of neatly chopped timber, apparently cut through with an axe. Two pieces of timber were deliberately broken to see if similar ends would result, but this produced jagged breaks quite unlike the exposed ends. The cuts are also unlike those made by beavers.

Bands of sand appear in the peat in the 21 cm below the woody peat and these layers contain many alder cones. A few fruits of *Carex* and a hazel nut were also found. This was underlain by 10 cm of peat containing fewer alder cones, a hazel nut and more frequent fruits of *Carex*, a fish scale and a frog bone. Below this 8 cm of peat contained a few alder cones. This graded into the underlying gravel. The distal end of the scapula of a water vole *Arvicola terrestris* was found here.

Mollusc shells were present in each layer and are being analysed.

\* 32 Caxton Road, Hoddesdon, Hertfordshire EN11 9PG

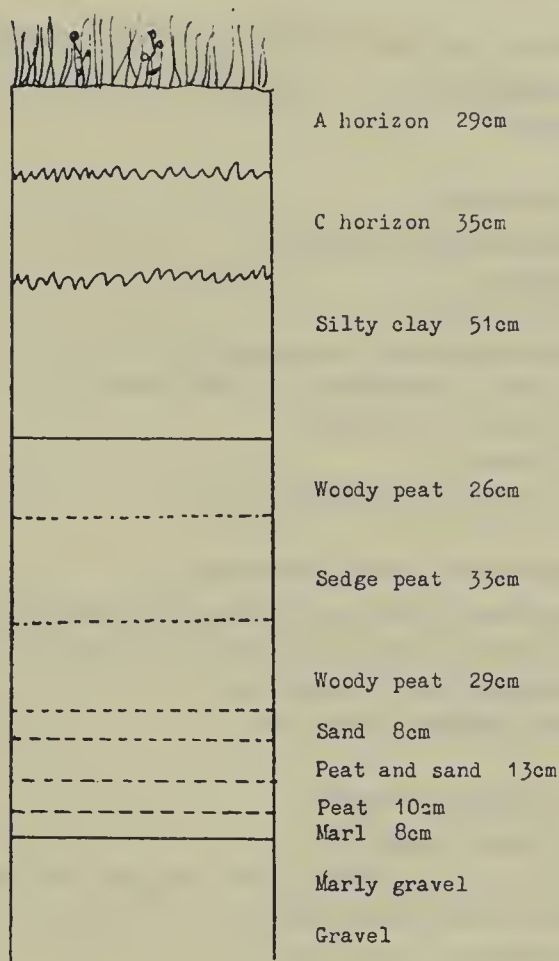


FIG. 1. The peat section at Stanstead Abbots.

### Remains of Large Vertebrates

Remains of large vertebrates were discovered only in the unstratified deposits. However, these unstratified deposits clearly consisted of the clay, peat and gravel encountered in the stratified deposits at the end of the pit, and the bones could be grouped into four classes according to colour and texture, allowing a tentative correlation with the various deposits. The remains are listed in Table 1.

The most likely origin of the first category is the soil and clay of the upper horizons, with a fauna of pig and sheep. Bones in the second category are probably from the peat, with a fauna of beaver, wild boar, red and roe-deer, horse and ox. The third and fourth categories probably originate from the gravel, with a fauna of red deer, horse, wild ox and reindeer. Based on these assumptions Table 2 summarises the number of bones found for each species in the three strata. The bones are illustrated in Fig. 2.

TABLE 1. List of animal remains found and the categories to which they were assigned. The numbers refer to the drawings in Fig. 2.

Group 1—smooth texture, unmineralized, white with some iron-staining.

*Ovis* sheep—mandible (17)

*Sus* pig—humerus

Group 2—blue-grey colouration.

*Arvicola terrestris* water-vole—scapula

Bird sp.—femur (16)

*Bos* ox—metatarsus (8, 4)

*Capreolus capreolus* roe-deer—antler core (25)

*Castor fiber* beaver—mandible (21), ulna (20), incisor (30)

*Cervus elaphus* red deer—skull (18)

*Equus* horse—molar (27)

*Sus* wild boar—mandible (22), calcaneum (31)

Group 3—brown, mineralised, iron and blue staining.

*Bos* ox or *Bison* bison—metacarpus (7), femur (23), radius (3)

*Cervus elaphus* red deer—tibia, molar (26), metatarsus (10), metacarpus (12).

*Equus* horse—radius, tibia (5), metatarsus (9)

*Rangifer tarandus* reindeer—antler (36)

Group 4—powdery, whitish, iron staining.

*Bos longifrons* wild ox—horn (38)

*Bos* ox or *Bison* bison—metatarsus (6, 24), phalange (29), tibia (14)

*Cervus elaphus* red deer—antler core (19, 32, 33, 34, 35, 37)

*Equus* horse—radius (13, 15), molar (28)

Group 5—mixed, unassigned.

*Bos* ox—metapodial (11)

*Equus* horse—metatarsus (1, 2)

TABLE 2. The number of remains referred to each stratum.

	Clay	Peat	Gravel
<i>Arvicola</i> water-vole	0	1	0
<i>Bos</i> ox or <i>Bison</i> bison	0	2	9
<i>Capreolus</i> roe-deer	0	1	0
<i>Castor</i> beaver	0	3	0
<i>Cervus</i> red deer	0	1	10
<i>Equus</i> horse	0	1	7
<i>Ovis</i> sheep	1	0	0
<i>Rangifer</i> reindeer	0	0	1
<i>Sus</i> pig or wild boar	1	2	0
Bird sp.	0	1	0



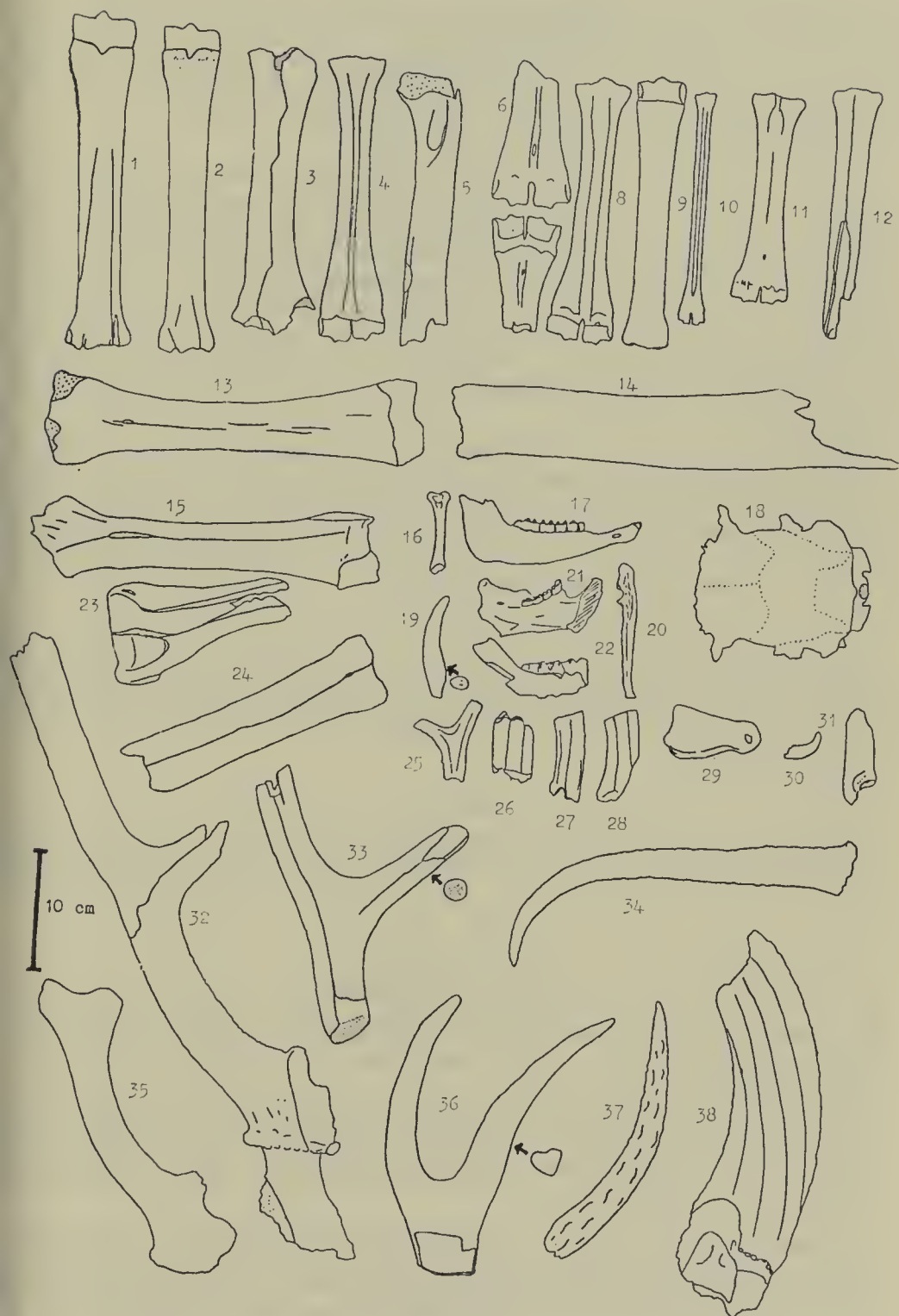


FIG. 2. Some of the bones found at Stanstead Abbots.

See Table 1 for their determination.

## Discussion

An interpretation of the observations is that the gravel deposits represent early open conditions where herds of large herbivores were relatively abundant. The peats are of later origin and indicate marshy and wooded conditions. The peat fauna is more diverse and includes several woodland species, and large herbivores are less prominent. Remains in the soil/clay suggest domestic stock and an impoverished wild fauna.

The peat section has a number of features in common with descriptions from Nazeing (Allison *et al.* 1952). The peat channel may well represent an old meander of the River Stort; this appears to have been abandoned and then formed a lake in which the marl accumulated and water-voles lived. At a later stage the lake appears to have been drained, with water-movement indicated by the sand; fen conditions then ensued and alder carr developed. This woodland was then apparently felled by human agency and fen conditions again prevailed, finally developing once more into woodland. This was subsequently smothered by a thick layer of silty clay deposited by the river during a period of greatly increased flow.

Although what appeared to be felled timber is the only evidence of human activity found, the area is potentially very interesting from an archaeological point of view. The site is close to the road past Rye House, which is a route of some antiquity, and was until relatively recently one of the few routes across the Lee marshes. A large gravel island, currently the Rye Meads Sewage Works, occupies the centre of the valley at this point. Several Mesolithic sites have been reported in the vicinity at Stanstead Abbots and Broxbourne (Kiln 1974).

The St Albans Sand and Gravel Company gave us permission to visit the site, and members of the S. E. Herts. Young Ornithologists' Club, led by Tony Aberdein, found many of the bones. Ian and Susan Summers and Geoffrey Cranwell assisted with the sorting of samples from the peat section, and Anthony Sutcliffe verified the identification of several of the bones.

## REFERENCES

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## Book Review

*The Observer's Book of Seashells of the British Isles.* By Nora F. McMillan. 158 pp, 8 colour plates + 195 line drawings. Frederick Warne, London 1977. £1.10.

This little book, in common with many others in this series, is well produced, and provides a useful basic reference guide for those really wanting a pocket-size book. The line drawings are adequate, although some, including *Cardium crassum*, *Donax vittatus* and *Nucula nucleus* are very poor. The coloured plates are disappointing both in quality and content.

Ms McMillan has made some unexpected errors in the text, for example the use of the old name *Cardium* instead of the widely accepted *Cerastoderma*, and many of the authors' names should not have been placed in brackets. Some errors of typography have evaded the proof-reader (e.g. p. 88, *Nucula Turgiaa* for *N. turgida*).

It is difficult to guess at what market this book is aimed; the subject of British seashells has been far more comprehensively covered by other books, only a little more expensive, now on sale.

KATHIE WAY

# The History of Woodlands in Hornsey

by JONATHAN SILVERTOWN\*

*Very old are the woods;  
And the buds that break  
Out of the brier's boughs,  
When March winds wake,  
So old with their beauty are—  
Oh, no man knows  
Through what wild centuries  
Roves back the rose.*

Walter de la Mare: 'All that's past'

## Summary

Historical sources are used to show that the woodlands of Hornsey are likely to be of primary origin (i.e. continuously present since prehistoric times). For Bishop's Wood, now built over, there is documentary evidence suggesting management as far back as the 13th century. The history of the woodlands since Roman times demonstrates that their proximity to the City of London has been an important factor in their exploitation and, more recently, in their preservation. The early management of Highgate Wood by the Corporation of London is briefly discussed and an explanation offered for the poverty of its present flora.

## Introduction

The parish of Hornsey in the London Borough of Haringey contains three oak-hornbeam woods with a total area of 97.6 hectares (See Fig. 5). The history of these woodlands is a story of many chapters and many changes. The purpose of this short account is to provide an historical background to the woods and to form a basis for ecological studies.

Human influence on the vegetation of the district is strongly implicated by what is known of the ecology of this part of north London as far back as 3,000 B.C. This is the provisional date set on the early section of a pollen diagram from a site on Hampstead Heath, about 3 km to the south-west of Highgate Wood (Girling & Greig 1977).

The earliest phase in the pollen analysis indicates that the area was covered by a mixed deciduous forest, predominantly of small-leaved lime *Tilia cordata*† and also containing oak *Quercus* spp., elm *Ulmus* sp., birch *Betula* spp., pine *Pinus sylvestris*, alder *Alnus glutinosa* and hazel *Corylus avellana*. In the second phase, around 3,000 B.C., there was a decline in elm and lime and the first appearance of cereals and weeds of cultivation. This phase also shows the first signs of heathland vegetation which are often accompanied by signs of human activity in the pollen record in Britain and north-west Europe (Gimingham 1972). Charcoal found in the third phase of the Hampstead sample suggests that the forest was cleared for cultivation, probably in patches, by burning.

Pollen analysis in Epping Forest (Baker *et al.* in press) shows an early Saxon decline in lime, much later than that provisionally dated at 3,000 B.C. for Hampstead Heath. Only soil pollen analysis (if suitable buried soil surfaces can be found) could reveal whether Hornsey's woods were cleared at either

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†Nomenclature follows Clapham, Tutin & Warburg (1962).



date and whether they are secondary. It seems unlikely that any extensive clearing took place on the clay before Saxon times. Small clearings would have little effect on the ecology of the woodlands overall, since small gaps are a usual part of the regeneration cycle in oak woodland (Streeter 1974).

In Hornsey itself, evidence from Roman times shows that its woodlands were of more than just local economic importance. Excavations in the north of Highgate Wood (Brown & Sheldon 1969, 1971) have revealed an early Roman pottery which must have supplied contemporary London with its products about A.D. 60. The surrounding woodland, as well as the local clay, would have been exploited in this industry. The woodlands were most probably managed on a coppice system which has been in use in Britain as a management practice since the Iron Age (Rackham 1976). A second Roman pottery, as yet unexcavated, is thought to have existed at about the same time at the southern end of the wood. It is likely that there was a settlement associated with this industry and that timber from the woods was used in its buildings.

The two major parent materials of the soils in the woods of Hornsey are London Clay and Bagshot Sand, the latter overlying the former. The soil formed on Bagshot Sand tends to be dry, whilst where the clay has been exposed by erosion or human exploitation the soil is damp. These soil types form a mosaic in some parts of the area, for instance in Highgate Wood, which makes it difficult to separate the vegetation of different woods into edaphic types. Most of the woods in the area contain, or used to contain, elements of the ground flora characteristic of both damp and dry oakwoods. Trimen & Dyer (1869) noted that Kenwood, just outside Hornsey, on sandy soil and on higher ground than the other woods of the district, has a greater number of large beeches *Fagus sylvatica*. This difference may be due to the natural 'preference' of beech for a well-drained soil, although being on the Kenwood Estate it is as likely that they were planted. The preponderance of sessile oak *Quercus petraea* at the same site and in Bishop's Wood (Tansley 1913) may be a result of its edaphic 'preference'. This question is compounded by the largely unknown effects of woodland management of which there is documentary evidence for Kenwood in the 16th century (LCC 1925), and indirect evidence as far back as the 13th century.

TABLE 1: The changing names of woods in Hornsey.

Medieval	17th century	18th century	19th century	20th century
?	?	?	Dirthouse Wood	Cherry Tree Wood
?	Great Colefall alias Finchley Coalfall	?	Coldfall Wood	Coldfall Wood
c.1241–Boscut heringe c. 1387–Bysschope-wode	?	Bishop's Wood	Bishop's Wood	Bishop's Wood
?	Brewers' Fall	Brewhouse Wood	Highgate Wood Gravel Pit Wood	Highgate Wood
?	Sowwood alias Oldfall	?	Churchyard Bottom Wood	Queen's Wood

It is therefore wrong to assume that any of the woodlands in Hornsey or district are 'natural' as was often the belief of 19th century botanists and antiquarians (e.g. Trimen & Dyer 1869; Lloyd 1888). Nevertheless, the woods which will be discussed here (see Table 1)—Coldfall Wood, Highgate Wood, Queen's Wood and Bishop's Wood (now built over)—seem to share a basic affinity with the oak-hornbeam woods of the rest of Middlesex (Kent 1975; Tansley 1913), Hertfordshire (Salisbury 1916, 1918) and Essex (Jermyn 1975). The trees and coppice most common or characteristic of Hornsey's woodlands today are listed in Table 2. Coppice trees such as hornbeam can grow to full height if allowed to do so by forest practice. In other woodlands oak may appear as a coppice tree whilst hornbeam might be treated as a standard, although this is unusual.

TABLE 2. The trees and shrubs of Hornsey's woodlands at the present time.

Standards	Coppice and shrubs
<i>Betula pendula</i>	<i>Acer campestre</i>
<i>B. pubescens</i>	<i>Carpinus betulus</i>
<i>Fagus sylvatica</i>	<i>Corylus avellana</i>
<i>Ilex aquifolium</i>	<i>Crataegus monogyna</i>
<i>Prunus avium</i>	<i>C. oxyacanthoides</i>
<i>Quercus petraea</i>	<i>Frangula alnus</i>
<i>Q. robur</i>	<i>Malus sylvestris</i>
<i>Sorbus aucuparia</i>	<i>Prunus spinosa</i>
<i>S. torminalis</i>	<i>Sambucus nigra</i>
	<i>Viburnum opulus</i>

### The Saxon Period

The Saxon endings: -ham ('homestead'), -ton ('enclosure', 'farmstead' or 'village'), and -worth ('enclosure') in the place-names of Middlesex are confined mainly to the lighter soils of the south and west of the county. Hampstead is one of the exceptions which proves the rule, being an early northern settlement on light soil where, as we have seen, there was forest clearance and farming probably in Neolithic times. Place-name elements implying new colonization and the presence of woodland, such as leah, holt and weald, occur mainly on the heavier soils of the east of the county (Gover *et al.* 1942). This suggests that settlement in the wooded area, largely on clay, was of a pioneering nature in Saxon times, and that woodland clearance for agriculture was not then extensive. This does not mean, however, that the woods were not intensively managed before this period, as the Roman remains in Highgate Wood demonstrate. The name Hornsey has been traced to 'Heringes-hege' (hege=a wood-land and enclosure), or 'Hering's enclosure' by Madge (1938), who mentions that a great warrior named Hering is recorded in an Anglo-Saxon chronicle of A.D. 603.

A number of field names mentioned in the court rolls of the manor of Hornsey (Marcham & Marcham 1929) during the 17th century are of Old English derivation. At least three fields were known as 'Redings' or 'Readinges', 'Ryding' meaning 'cleared land' (Field 1972). The woodland may have been cleared by burning, as the name of Barnet (Baernet=place cleared by burning) suggests that this took place further to the north.

From some unknown date, perhaps even before the Norman Conquest, the western half of Hornsey formed a hunting park belonging to the Bishop of London. Madge (1938) states that Hornsey has been part of the diocese of London since A.D. 604, and suggests that the episcopal manor of Hornsey was



co-extensive with the parish until the Conquest, when the manor was divided and the eastern part became the manor of Brownswood. This manor contained Hornsey Wood which finally vanished in the 19th century; the site is now Finsbury Park.

A hunting lodge stood in the Bishop of London's Park at the northern end of a wood, later to be known as Bishop's Wood, and now on the site of Highgate golf-course. Norden (quoted by Lloyd 1888) saw the ruins of the lodge in the late 16th century and remarked that "... by the foundation, it was rather a castle than a lodge, for the hill is at this time trenched with two deep ditches ...". Madge (1938) interprets these fortifications as evidence that the lodge was built in pre-Norman times to defend the Bishop's lands. It is possible that the hunting park was not enclosed until the Conquest, when the lodge would have assumed a less strategic role.

### **The Bishop's Park**

The evidence of woodland in Hornsey from the Domesday Book is indirect since the manor was not actually recorded by name. Madge (1938) has shown that Hornsey was included in the entries for Stepney. Finchley was similarly included as a part of the lordship of Fulham, and Campbell (1962) notes that these are the only two Domesday entries from the lighter soils of south Middlesex, which suggest large tracts of woodland. It seems probable that the entries 'wood for 1,450 swine' in Fulham and 'wood for 770 swine' in Stepney actually refer to woodlands in Finchley and Hornsey, respectively. However, these assessments do not necessarily mean that 770 pigs were pastured in the woods; nor can the figures be reliably converted into an estimate of the area of woodland present at the time, though it must have been extensive. The fact that the tract of woodland appears in Domesday indicates that it was of economic value and subject to tax. Consequently, such woods must have been managed, either as wood pasture or as coppice.

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## **Book Review**

*The Thames Transformed. London's River and its Waterfowl.* By Jeffery Harrison & Peter Grant. Photographs by Pamela Harrison. 240 pp 22 colour + 69 black and white photographs, nine maps and figures 70 tables. André Deutsch, London. 1976. £5.95.

A highlight of the society's 1975 symposium on the Thames was the splendid illustrated lecture by the Harrisons on the return of bird life to the river. In *The Thames Transformed* the theme is extended with a complete historical record of the ornithology of the Thames and its estuary up to and including the 1975/76 winter. The first part of the book, mainly by Peter Grant who organised the river surveys and the shore counts from the late 1960s, deals with the LNHS 'Lower Thames' recording area. The second part, mostly by Jeffery Harrison, describes the bird life of the estuary, the Essex shore (Tilbury to Foulness) and the north Kent marshes (Gravesend to Shell Ness). The text abounds with interest and good description, and the pages have been made particularly attractive by the inclusion of over 90 of Pamela Harrison's delightful photographs of wildfowl, waders and habitats. Sensibly the inevitable mass of numerical data gained from the field-work is presented by tables within the species text. Biological studies from other fields seem particularly well researched, and information is nicely indexed and easy to locate. In preparing such a timely volume the authors are to be congratulated on their skill and enthusiasm, for not only have they provided a much-needed monograph on the Thames for field-workers, but they have also assembled much vital evidence for conservationists, particularly in the light of current threats to habitats by industrialisation, reclamation and pollution.



Later, in the 12th century, William Fitz Stephen wrote in his account of London: "Close by on the north side of London lies an immense forest in which are densely wooded thickets, the coverts of game, red and fallow deer, boars and wild bulls" (Cox 1911).

The field pattern shown in Fig. 1, taken from the 1864 Ordnance map, shows the boundary of the Bishop's Park as a 'ghost' which is thrown into view by the field pattern on either side of it. Fig. 1 also shows the parish boundary running along the western boundaries of Coldfall Wood and the 'ghost' of Tottenham Wood. This suggests that both these woodland borders predated the laying out of the parish boundary which used the woodlands as boundary features.



FIG. 1. The field pattern in north-west Hornsey and district.

Based on Ordnance Survey map, 1864). 1 Turner's Wood; 2 Bishop's Wood; 3 'Ghost' of Finchley Fall?; 4 'Ghost' boundary of Bishop's Park; 5 Dirthouse Wood; 6 Gravel Pit Wood; 7 Churchyard Bottom Wood; 8 Coldfall Wood; 9 'Ghost' of Tottenham Wood. The thick lines indicate roads and the broken line manor boundaries.

Bishop's Park was divided into two sections referred to as the Great and Little Parks. The former lay to the west of the present Great North Road and the latter to the north-east (see Fig. 2). Only a remnant, Turner's Wood, remains of Great Park, whilst Little Park is represented by Cherry Tree Wood and Highgate Wood.

The earliest reference to a park in this area appears to be in a grant made by Henry III to the Monastery of the Holy Trinity at Aldgate in 1226, when he gave the monks the woodland and heathland lying to the south of the 'Bishop's Park' (Calendar Charter Rolls 1226). Later, in about 1387, there is a reference to "Byssehopewode" (Gover *et al.* 1942), but most references in the close rolls refer to "boscus de Heringaye". It should be noted that Hornsey and Haringey were synonyms from an early date. The entries were all made on occasions when the Bishop of London's lands fell to the administration of the king due to the death of the bishop and the voidance of the see. On occasions the episcopal lands were administered by the king and treated as his own property for several years at a time, because there was a disagreement about the appointment of a new bishop. As a result, there are a number of entries in the close rolls referring to the woodlands of Hornsey in the 13th and 14th centuries. The following account is based largely on material published by Madge (1939): In 1241 ten live deer from the "Park of Haringeye" were given to the Earl of Pembroke and these followed by another four in 1242. "Master Adam the Saucer" received "three oaks in the foreign wood of Heringeye of the King's gift" in 1241; the wood referred to is described as foreign because it was outside the pale of Bishop's Park. The trees may have been taken from Coldfall or Queen's Woods, for instance (see Fig. 2). There were other gifts of timber in 1242 and a gift of five pollards to the King's clerk for his hearth. When the see became void in 1273, under Edward I, a number of purchasers of timber from Bishop's Park sought permission from the king to remove trees felled before the bishop's death. Amongst these requests was one from the friars of the orders of St Dominic and St Francis who, it appears, had been supplied with timber from Haringey Park for their buildings in London for 10 years.

Bishop's Park contained arable and pasture as well as woodland, which supported some livestock. The Reeve's account for a period in 1284 recorded the receipt of £1. 13s. 0d. for the pannage of pigs belonging to Hornsey and Finchley.

The park was almost certainly surrounded by a ditch and a bank surmounted by a fence, the park pale. Maintaining this fence alone would consume a considerable amount of wood. This was supplied, no doubt, by coppicing and felling in the park itself, and possibly in 'foreign' woods, too. Shirley (1867) quotes a description of the usual practice in the 16th century: "Our parkes are generally inclosed wyth strong pale made of oke, of which kinde of woode there is great store cherished from tyme to tyme in aech of them, onely for the maintenance of the sayde defence and safe keeping of the Deere from ranging about the country."

The bishop's lodge was occupied till at least 1335, which is the year of the last document dated there. When Norden described the ruins of the lodge as he saw them in 1593, there were "okes at this day standing, above one hundred years growth, upon the very foundation of the building." In 1580 the State Papers (Domestic)\* recorded that the Bishop of London received £1,466. 0s. 4d. in two years from the sale of wood and timber throughout his bishopric. This probably included trees and coppice from Hornsey. Another entry in the State Papers of 1669 ordering a gamekeeper at Highgate to prevent the poaching of red deer, pheasant, partridge and hare indicates that the area, if not the park itself, was still managed for game.

\* This information comes from the Calendars; the originals have not been consulted.

# The 17th and 18th Centuries

The court rolls of the manor of Hornsey contain a richer picture of the woods of the district and their importance in local life than any other single historical source. A commonwealth survey of 1645 (Calendar Close Rolls 1647) sets the scene with a list of the woods of Hornsey sold by the parliamentary trustees to Sir John Wollaston: "Great Colefall alias Finchley Coalfall near the common, Sow woodfall alias oldfall with little fall adjoining near Sowwood common. Finchley Fall, Jarvis' Fall, Pope's Fall, Hangman's Hawte . . .". Altogether sixteen 'Falls' and nine 'Hawtes' are mentioned within the manor. These have been located on the map in Fig. 2 as far as it has been possible to do so from information in the court rolls and field patterns shown on the Ordnance Survey map of 1864 (see Fig. 1). All but two 'Hawtes' have been omitted from the map, since most were 'grubbed up' before the first Ordnance Survey, and their exact location is problematic.

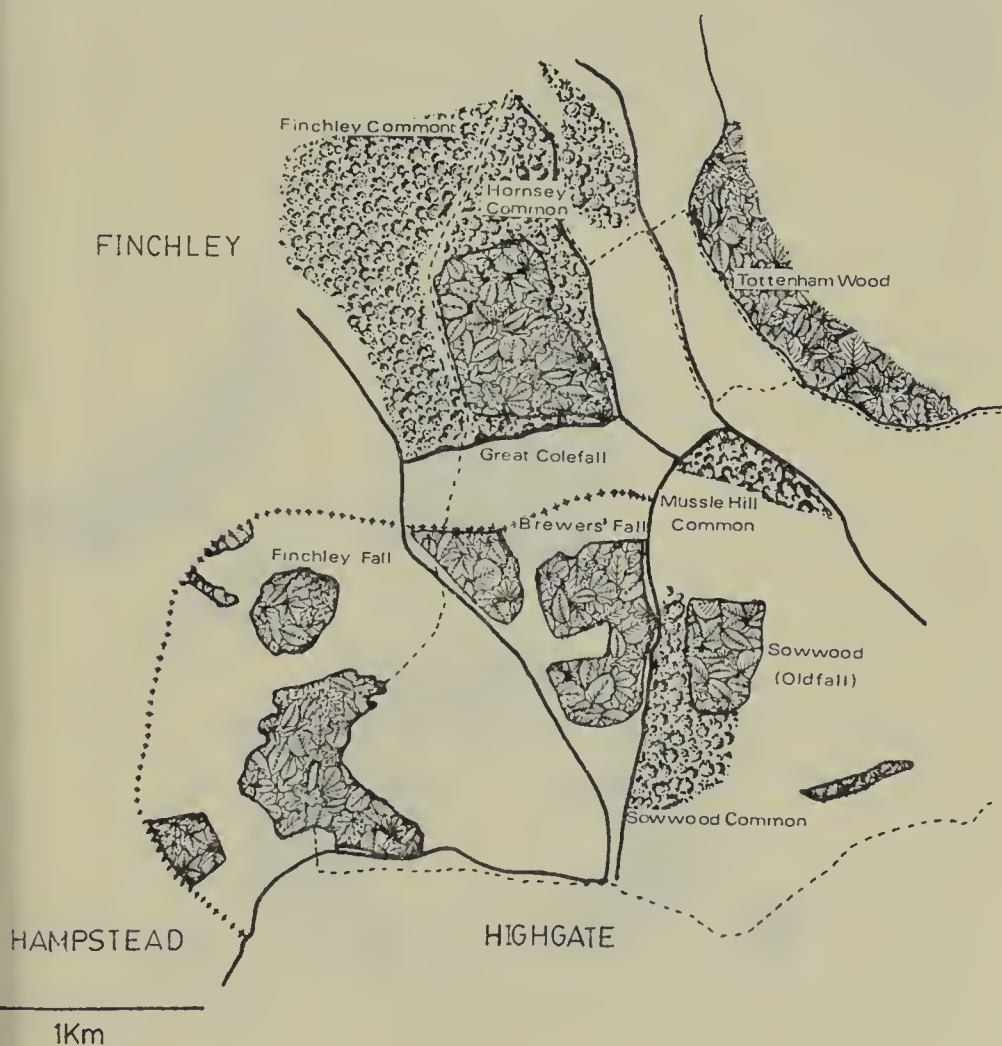


FIG. 2. Major woodlands and wooded commons in north-west Hornsey and district about 1650.

(Based on Ordnance Survey map 1864, and Marcham & Marcham (1929)). For symbols see Fig. 3.



The exact connotation of the word 'Hawte' is unclear, but it seems likely that it was the name given to a thin strip of woodland such as the 19th century Watery Wood (Fig. 4), at the edge of a field. A number of these 'Hawtes' are listed in the survey as being within a particular tenant's grounds, which suggests that they were small. The court rolls contain several references to very small woods of about one acre (0.4 hectares) which seem to have changed hands with particular parcels of land and these may actually be 'Hawtes'. The name itself suggests some connection with 'hedge', and 'Haw' is the name for a thin strip of woodland in some parts of Britain (Pollard *et al.* 1974). 'Hawtes' may originally have been left as wooded borders to the fields which were cleared from the woodland some time long before the 17th century. Strips of woodland known as 'Shaws' border many fields in the Sussex Weald where their purpose is thought to have been to give shelter to stock after the woodland was cleared in medieval times (Brandon 1973).

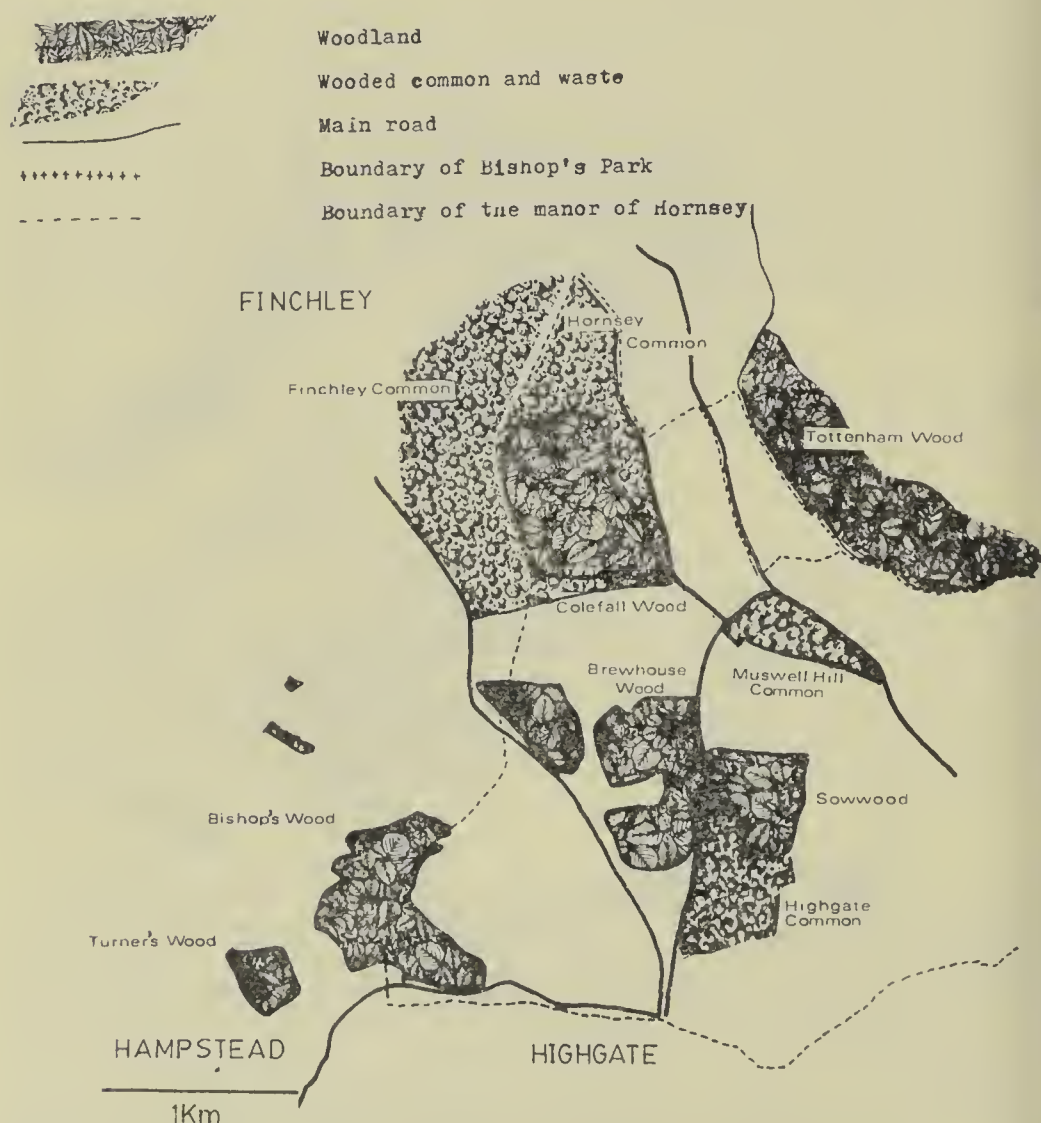


FIG. 3. Major woodlands and wooded commons in north-west Hornsey and district about 1754.

(Based on Ordnance Survey map 1864, and Rocque map 1754).

The meaning of the name 'Fall' and the economic importance of such woods in the 17th century is much clearer. The word 'Fall' appears in other counties of England in the sense of a compartment of a coppiced wood. Rackham (1976) quotes part of a 16th century valuation of a wood in Suffolk in which one compartment of the coppice is exhausted: "The sprynge [regrowth] . . . not valuyd because the wood ys old . . . which once fallen shall never be any wood agayne." A coppice named as 'Decayed Fall' in the commonwealth survey of Hornsey's woods may have been in this condition. In Hornsey, 'Fall' seems to refer to the whole of a coppice rather than just a part, as in a court roll entry of 1667: "Wee present that the woods called Oldfall and Colefall by the antient custome of the mannor ought to be laid open within five years after the fall of the said woods . . .". This entry suggests that both woods were coppiced throughout in one season and that they were not divided into compartments. No signs of boundary banks can be found in these woods today. From the entry in the State Papers of 1580 (see above) it seems that large supplies of wood were sent to London from the bishop's manor. This, and the absence of compartments, may indicate that coppicing was rotated between several of the falls of Hornsey and Finchley in order to provide a large, constant supply of fuel.



FIG. 4. Woodlands in north-west Hornsey and district in 1864.

(Based on Ordnance Survey map, 1864). For symbols see Fig. 3.

The two woods mentioned in the court roll of 1667 are the ones known today as Queen's Wood and Coldfall Wood. Both of these were bordered by common land (see Fig. 2), and were apparently subject to the rights of commoners to pasture their animals. Thus a conflict of interests arose between the commoners and the lord of the manor or holder of the rights of underwood in the coppices. Grazing animals would tend to destroy a coppice if allowed in too frequently or too soon after cutting. The remains of a wood-bank with a ditch on its outer side, which protected the coppice, are still to be clearly seen along the western edge of Coldfall Wood where Finchley Common once lay, and at the northern edge where the wood met Hornsey Common. This bank would have been surmounted by a hedge or a fence to keep animals, grazing on the commons, outside the wood.



FIG. 5. Woodlands in north-west Hornsey and district in 1974.  
(Based on Ordnance Survey map, 1974). For symbols see Fig. 3.

Queen's Wood also has a wood bank which runs along the southern half of its western border, and then can be traced through the interior of the present wood to its northern edge. This bank has a line of pollarded hornbeams along its southern section and such trees must at one time have marked the boundary



between the wood and the 'waste' along its whole length. Though the present pollards are of recent origin, this was the usual form of tree on boundaries; pollards yielded a regular crop of wood which was out of the reach of animals browsing on the neighbouring land. One can only speculate as to when the waste along Muswell Hill Road became incorporated into this wood, but its 19th century name 'Churchyard Bottom Wood' gives a clue. It is said (Lloyd 1888) that it comes from the plague victims buried there in the Great Plague of 1665. This suggestion arose from the discovery of human bones on the western edge of the wood in the last century. If these bones did actually mark the site of a 17th century plague-pit outside the line of the wood bank, then the bank probably marked the edge of the wood till at least 1670. It seems safe to assume that the pit would have been dug on the waste and not in the woodland, which was coppiced at the time.

Woods were not the only place where trees were to be found in large numbers in Hornsey in the 17th century. In addition to the timber growing in the hedges of the manor, there were also the commons of "Finchley, Hornsey, Musselhill and Sowwood which contain 600a upon which commons are growing great store of oake elm and hornbeame trees worth £295" and which John Wollaston bought along with the rest of the manor (Calendar Court Rolls 1647). These trees, judging by the species composition, may have been the last remnants of ancient wood pasture, perhaps even part of the "wood for 1,450 swine" recorded in Domesday for Fulham and attributed to Finchley (see above). There is some further evidence to support this idea in Middleton's (1798) description of the several thousand pollarded hornbeams and oaks which were still to be seen on Finchley Common over a century later. "Their numbers must annually decrease, as no new ones are permitted to rise and I observed that several had lately 'been grubbed up'". This is precisely the degenerate state one could expect a wood to be in after serving as pasture for several hundred years. Pollarding can prolong the life of a tree to a great age (Rackham 1974) and hence the pollards of Finchley Common, and those which must have existed on the other commons in the district, were probably all that remained of ancient woodland turned over to pasture.

There are frequent references in the court rolls to the cutting of furze *Ulex europaeus* on the waste and on Sowwood Common, and the collection of bracken *Pteridium aquilinum* from the common and in Sowwood (Queen's Wood). Bracken would have been used as bedding for animals and could only be "cut yearly until the twenty-fourth day of August". Gorse was almost certainly used as fuel by the cottagers of the manor and could be cut "yearly from the twenty-ninth day of september unto the first day of may . . .". An entry in the court rolls of 1671 says that the furze growing by the roadside was "appointed for the repaireinge [of] the highways". There are also a number of entries showing that commoners quite often helped themselves to wood and timber from the lord of the manors' coppices and hedges and dug sand from Sowwood Common. This pilfering must have been an important source of fuel for the poor even into the 19th century. Middleton wrote in 1798, from the landowners' point of view, that: "Cottagers who live on the borders of commons and woods and cospes are a real nuisance, from the circumstance of a considerable part of their support being aquired by pilfering."

The 18th and early 19th centuries were ages of the 'agricultural improver', when the best use to which land could be put was a matter of fierce argument. Middleton (1798) gave the opinion that only ground fit for nothing else should be used for woodland. He claimed that woodland turned over to pasture in the district increased its value five times in just a few years. The fact that "The cospes and woods of this county have been decreasing for ages," was

presumably a result of landowners realizing this fact. The woodlands of Hornsey mostly survived this period in contrast to "The hills about Copthall and Hornsey [which] are now appropriated to the scythe; though but a few years ago they were covered with wood" (Middleton 1798). The major piece of woodland to disappear on Hornsey's borders at this time was Tottenham Wood (see Fig. 3), which contained 388 acres (157 hectares) in 1619, most of which was cleared between 1754 and 1789 (see the *Victoria County History* for Edmon-ton Hundred). This ancient wood marked the north-east boundary of Hornsey from before the middle of the 12th century, when a part of Hornsey was given as a gift by the bishop. 'Clerkenwell Detached' was reincorporated into the Borough of Hornsey at the beginning of the 20th century.

Throughout the 17th and 18th centuries Hornsey's woodlands appear to have fulfilled a role by being sources of wood and timber for the local inhabitants and for the Bishop of London. Whilst most of the smaller woods or 'Hawtes' of Hornsey probably disappeared during the 18th century, it was the late 19th and early 20th centuries which saw the biggest changes in the size and the economic importance of the woodlands in the parish.

### **The 19th and 20th Centuries: From Woodland to Suburban Park**

In 1813 a road was built to bypass Highgate Hill on the north side; this cut through Brewhouse Wood which became known as Gravel Pit Wood (see Fig. 4) at about this time (Schwitzer 1973). The area from which the gravel was extracted is in the north-west corner of the present Highgate Wood, and can be readily distinguished by the unevenness of the ground and by the wavy hair grass *Deschampsia flexuosa* growing on the acid soil of the site.

Coppicing was probably a regular practice in all the woods until the Earl of Mansfield leased them in 1842 (N.R.A. 10988 p514)\*. There is some evidence to suggest that Gravel Pit Wood, at least, was left unmanaged after about 1840. The effect of this neglect over the following forty years was to allow a dense undergrowth to develop, which probably resembled parts of Queen's Wood today.

Between 1865 and 1900, Hornsey grew rapidly into a well-populated suburb (Aris 1974). By the time Lord Mansfield's lease of the woods of Hornsey expired, and came under the control of the Ecclesiastical Commissioners in 1884, they had valuable potential as building land. However, because the woods, especially Gravel Pit Wood and Churchyard Bottom Wood, were unique as the most accessible surviving woods near the City, they had also become a favourite place of recreation. Consequently, a campaign was begun to save them for public enjoyment. In 1885, the Ecclesiastical Commissioners decided to build a road through Bishop's Wood and to give Gravel Pit Wood to the Corporation of London to be managed as a public open space (Minutes of the Ecclesiastical Commissioners' Estate Committee, 22 January 1885, File 65788). One factor in the decision may well have been, as a leader of *The Times* pointed out, that property values would fall if the district lost the woods which were regarded as an amenity. Churchyard Bottom Wood was purchased by Hornsey Council in 1889 and renamed Queen's Wood.

A description of Highgate Wood by W. H. Hudson (1898) shortly after it was acquired by the Corporation of London gives us a picture of its unmanaged appearance: "A very large portion of the space called Highgate Woods is veritably a wood, very thick and copse-like, so that to turn aside from the path

\* I have been unable to gain access to any of the Mansfield papers to check this.



is to plunge into a dense thicket of trees and saplings, where a lover of solitude might spend a long summer's day without seeing a human face." Not many years afterwards the wood has changed considerably: "... Highgate Woods, which thirty years ago were a blaze of colour in spring, are now so intersected by cinder and asphalt paths that their beauty has almost been destroyed. Blue bells are practically non-existent, and the thousands of wood anemones are now represented by a few miserable clumps of leaves here and there. The better drainage of the woods has destroyed numerous plants, and several fine clumps of such plants as *Carex pendula* and *Carex vesicaria* have been lost. Bishop's Wood, too, in Hampstead, is being rapidly spoiled . . ." (Nicholson 1916).

An unpublished photograph of Highgate Wood (Prickett 1842), taken just before the turn of the century, shows bundles of wood stacked by newly cut coppice stools. This is almost certainly a picture of the management of the wood by the Corporation of London shortly after they assumed control. The records of the Coal and Corn Finance Committee, which dealt with open spaces, show that from 1899, if not before, the Corporation regularly cut undergrowth and saplings in the wood. This was carried out every winter till at least 1906, despite complaints from the Chairman of the Hornsey Board in 1899. The effect of this annual cutting enabled visitors to enter more parts of the wood and to destroy the ground vegetation by trampling. This also began the process of soil compaction which, by the 1960s, made it impossible for plants to take root in the hardened soil, so that disc harrowing had to be introduced.

Whilst the early management of the wood in the hands of the corporation produced a dramatic decline in the ground vegetation, this might be expected anyway in the longer term, unless the hornbeam coppice was cut and light was allowed through to the ground layer. Although Queen's Wood has a dense shrub layer in parts, it has very little ground flora, no doubt for this reason.

A number of fenced enclosures, which have been made in Highgate Wood at different times during this century, illustrate the effects of management on regeneration. These effects have varied depending on whether the tree canopy has been cut back to allow in light, and whether the ground has been prepared to enable seedlings to become established. The 1920 revision of the Ordnance Survey map shows three enclosures, one of which was—or became—a bird sanctuary until the fence was removed c. 1950. There is no sign today that the enclosure of these areas had any permanent effect on their vegetation, and there is no evidence that young trees became established. Presumably, this is because the soil was compacted and the canopy over the enclosures was not cut back. By contrast, several smaller areas which were fenced and dug-over between 1947 and 1955 now contain a number of self-sown tree species including oak, hornbeam and birch. There is very little ground flora, however. These areas are no longer fenced and the thickets which have grown up in them appear to be thinning out, due to competition and damage by visitors. Three large enclosures of about one hectare have been made in the last ten years, and regeneration of the ground flora in these has been dramatic. This may be largely due to the exclusion of trampling, since no severe thinning of the tree canopy has been carried out. Most new trees in these areas appear to have been planted, and the planting of oak has also taken place in a small enclosure from which old trees have been removed.

What remains of Coldfall Wood (see Fig. 5), which is also a public park purchased by Hornsey in 1930, lacks both the shrub and ground layers of the normal oak-hornbeam woodland. It has a bleak future unless active management is undertaken.

No detailed description of Bishop's Wood before it was built over in 1920 exists, to my knowledge, although Tansley (1913) lists a number of plants found there. The flora is described as being especially rich because of the conjunction of both sandy and damp oakwood associations. *Quercus petraea* was the dominant oak, and many can still be seen in the gardens of Bishop's Avenue.

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# Wild Flowers of London W1

by ROSALIND M. HADDEN\*

## Summary

The wild flora observed during the summer of 1975 in the small and heavily built-up central district of London W1 amounted to 157 species. Available habitats are discussed. The composition of the flora was found to correspond fairly well with the distribution already recorded for a much wider area of metropolitan London, extending out to the suburbs. The survey showed that botany need not be restricted to the countryside.

## Introduction

Living in central London, I used to think my botanical interests must be confined to the occasional trip to the country. This paper is the record of my discovery that I was wrong.

In April 1975, impelled at first mainly by curiosity, I decided to see whether there were any wild flowers in the old postal district of London West One, where I live and work. The W1 district is small, conveniently defined (Fig. 1), and among the most heavily built-up parts of the West End; when I found that it excluded all three central parks (Regent's Park, Hyde Park and Green Park), the project became even more of a challenge. The district lies neatly between these parks, forming a rough square of over a mile (1.6 km) each way, with the busy shopping thoroughfare of Oxford Street running east-west through the middle. North of Oxford Street it covers the southern part of St Marylebone and the western fringe of Bloomsbury; south of Oxford Street it includes Mayfair and most of Soho—all areas renowned for almost anything but wild flowers. To be precise the W1 postal district is bounded on the north by Marylebone Road, on the east by Tottenham Court Road and part of Charing Cross Road, on the south by Piccadilly, and on the west by Park Lane and Edgware Road. It is all in Watsonian vice-county 21 (Middlesex).

The district of W1 is almost entirely covered by houses and streets, and has been so for at least 150 years. It is virtually devoid of what might be called natural features, but presents an intricate three-dimensional pattern of brick, stone, concrete and tarmac. There is very little variation in ground level, and no surface water whether stream, pond or canal; no marshes, commons, woods or hedgerows; no railway cuttings; not even a municipal dump.

There are two public gardens: a former cemetery in Paddington Street off Marylebone High Street, and the gardens of St George's church, off South Audley Street in Mayfair. There are also twelve communal gardens in residential squares, mostly again in Marylebone and Mayfair, six of which are stoutly railed and locked, with access only for the residents, and six that are open to the public which are generally thronged with people. All these gardens are so neatly kept that it was fairly clear, even in April, that wild flowers—weeds—would be few and far between. There are virtually no other public open spaces in W1, though there are some private ones—forecourts, etc. However, most of its eighteenth and early nineteenth century houses were built with enclosed yards behind, and I knew, because I enjoy one myself, that some at least were still 'being cultivated as private gardens. There are also many windowboxes, and even some flowerbeds, at the front of various buildings, particularly the recent blocks of flats and offices; and there are a few roof gardens. Even though separated from each other by high walls and busy streets, there is thus a network of tiny cells of cultivation stretching across the

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whole district between the big green spaces of Regent's Park, Hyde Park and Green Park.



FIG. 1. The London W1 postal district, delimited in heavy outline. The communal gardens (shaded) are 1 Bryanston Square (locked), 2 Montagu Square (locked), 3 Paddington Street Gardens, 4 Park Crescent Gardens (locked), 5 Fitzroy Square (locked), 6 Portman Square (locked), 7 Manchester Square (locked), 8 Cavendish Square, 9 Grosvenor Square, 10 Hanover Square, 11 Soho Square, 12 St George's (Hanover Square) Gardens, 13 Berkeley Square, and 14 Golden Square. Buildings shown are BM British Museum, BP Buckingham Palace, E Euston, HP Houses of Parliament, KC King's Cross, P Paddington, SM St Marylebone and SP St Pancras.

There is also a variety of uncultivated building sites, again usually small and inaccessible behind hoardings, but at least free from gardeners. The largest of these may be used as temporary car parks; the smallest simply represent the floor area of a single terrace house—perhaps not as much as 5 x 10 m. Because of the high cost of land, these sites are usually built up again in a few months so there is little chance of any long-term plant community establishing itself, but weeds of some sort are soon in evidence—Oxford ragwort *Senecio squalidus* usually among the first.

Finally, the buildings themselves offer an inhospitable foothold. The sunken areas in front of the older houses provide good shelter, though not much light, and the walls of these are often colonised by ferns (mainly bracken *Pteridium aquilinum* and male fern *Dryopteris filix-mas*). Ferns will also grow in old pavement coal-hole shafts, provided the cast-iron cover is pierced so that light can enter—though any frond protruding would quickly be trodden off. Any ledge, cornice or recess offers a modicum of shelter; wind-borne dust, or

decaying mortar, does duty for soil; a leaking gutter provides extra water. The very cracks between the pavement slabs harbour tiny plants of annual meadow-grass *Poa annua* and procumbent pearlwort *Sagina procumbens*, and the more generous spaces between the cobblestones, paving the older mews, have a correspondingly more generous flora, including common mallow *Malva sylvestris*, annual mercury *Mercurialis annua* and small nettle *Urtica urens*.

Conditions in any of these habitats are distinctly metropolitan. Central London's atmosphere, though no longer so polluted by coal fires as to inhibit most plant growth except the London plane, is still not all that clean; and the amount of sunlight reaching ground level at many sites is very small, depending entirely on the height and position of the buildings round it. Temperatures generally are moderate, mostly higher for longer periods than in open country; lack of water is the main problem, with a naturally low rainfall accentuated by the drying effect of urban warmth and of wind—in which one must include the currents of air circulating around high buildings. Any "soil" exposed is a mixture in varying proportions of builders' rubble, old soot, dust, ordure and rotting litter, with perhaps a substrate far below of London Clay; in many gardens and windowboxes it is completely replaced by fresh soil carried in from a considerable distance—possibly introducing a variety of pests and unexpected seeds—or at the very least improved with large amounts of peat and fertiliser.

Wild plants can thus grow in W1, but under difficulties—often stunted or deformed, subject to pests and diseases, and liable to early death. Where conditions are really harsh they may not reach the flowering stage at all, or may flower at abnormally small size. For example, I found flowering specimens of willowherbs *Chamaenerion angustifolium* and *Epilobium hirsutum* only a few inches high, a fraction of their normal size. If seed does form, dispersal may be a problem. Wind-borne seeds are obviously at an advantage in colonising whatever habitat becomes available, and many of the most successful species are of this kind: *Cirsium*, *Epilobium*, *Senecio*, and *Sonchus* spp. Seeds may also be dispersed by birds, mice or by human agency, particularly on vehicles; it was significant that the only colony of pineappleweed *Matricaria matricarioides* was in a site being used as a car park.

The particular and characteristic hazard of metropolitan life is the sheer pressure of numbers—too many feet trampling, too many vehicles, too many pigeons greedy for anything green, too many dogs making messes, too many municipal street cleaners keeping things tidy, and too many house-proud residents.

### The Flora

I hoped to be able to muster perhaps 50 or 60 different species, by dint of counting not only self-sown seedlings of planted trees, shrubs, etc., but also anything which, though perhaps originally planted, had "gone wild" in unlikely surroundings, like the three metre ash sapling I saw growing in a 15 cm window-box. I soon passed that total. As the marvellous summer of 1975 wore on I spent my weekends compulsively quartering the streets, until when I took my last photograph in October I had found more than 150 different species. I expect there were many more I did not see, or could not identify. Identification in the "field" posed problems, but I tried not to pick specimens unless there was more than one. I managed to photograph them all, ignoring the comments from passers-by. One bonus of close-up photography was that the nearby tin cans and toffee papers were out of view, so my photographs were a bit misleading: they made the plants look too pretty. Table 1 gives the species I found, together with some details of habitat, frequency, etc.

TABLE 1. Species observed in London W1, April–October 1975. Scientific names without authors are taken from Dandy (1958). Cultivated sites include gardens, windowboxes, ground at foot of street trees, and works in Park Crescent Gardens. Uncultivated sites are cleared areas, such as building sites and car parks. Stonework includes pavements, walls and other parts of buildings, etc.

Kent (1975): common in district 7	Species observed	Infrequent species		Habitats		
		single plant	one site	culti- vated	unculti- vated	stonework
X	<i>Acer pseudoplatanus</i>			X		X
X	<i>Achillea millefolium</i>			X		
X	<i>Aegopodium podagraria</i>	X	X	X		
	<i>Aesculus hippocastanum</i>	X	X	X		
X	<i>Agropyron repens</i>			X	X	
X	<i>Agrostis tenuis</i>					X
	<i>A. tenuis</i> x <i>castellana</i> Boiss. & Reut. (?)	X	X	X		
X	<i>Ailanthus altissima</i>		X			X
X	<i>Alopecurus pratensis</i>		X	X		
	<i>Althaea</i> sp.	X	X		X	
	<i>Amaranthus</i> sp.		X			X
X	<i>Anthriscus sylvestris</i>	X	X	X		
	<i>Antirrhinum majus</i>				X	X
	<i>Arabidopsis thaliana</i>		X	X		
X	<i>Arctium minus</i>		X		X	
X	<i>Armoracia rusticana</i>	X	X	X		
X	<i>Arrhenatherum elatius</i>		X	X		
	<i>Artemisia absinthium</i>		X		X	
X	<i>A. vulgaris</i>				X	
X	<i>Aster novi-belgii</i> (?)					X
	<i>Athyrium filix-femina</i>					X
X	<i>Atriplex hastata</i>				X	
X	<i>Ballota nigra</i>			X	X	
X	<i>Bellis perennis</i>			X		
X	<i>Betula</i> cf. <i>pendula</i>	X	X			X
	<i>Brassica oleracea</i>				X	X
	<i>B. napus</i> (?)		X			X
X	<i>Bromus mollis</i>	X	X	X		
X	<i>B. sterilis</i>	X	X			X
X	<i>Buddleja davidii</i>				X	X
X	<i>Calystegia silvatica</i>		X		X	
X	<i>Capsella bursa-pastoris</i>			X	X	X
	<i>Cardamine hirsuta</i>			X		
	<i>Chainaenerion angustifolium</i>			X	X	X
X	<i>Chenopodium album</i>			X	X	X
X	<i>C. polyspermum</i>		X	X		
	<i>C. rubrum</i>	X	X	X		
X	<i>Circaea lutetiana</i>			X	X	
	<i>Cirsium arvense</i>				X	X
X	<i>C. vulgare</i>			X	X	
	<i>Clematis</i> cf. <i>vitalba</i>	X	X		X	
X	<i>Convolvulus arvensis</i>	X	X	X		
X	<i>Conyza canadensis</i>			X	X	
	<i>Corydalis lutea</i>	X	X			X
X	<i>Crepis capillaris</i>	X	X			X
X	<i>C. vesicaria</i>		X		X	
	<i>Cymbalaria muralis</i>					X
X	<i>Cynosurus cristatus</i>	X	X	X		
X	<i>Dactylis glomerata</i>			X	X	
	<i>Datura stramonium</i>		X	X		
	<i>Digitaria sanguinalis</i>					X
	<i>Diploxaxis muralis</i>			X	X	
	<i>D. tenuifolia</i>		X	X		
	<i>Dryopteris dilatata</i>	X	X			X



Kent (1975):  
common in  
district 7

Species observed

Infrequent  
species

Habitats

		single plant	one site	culti- vated	unculti- vated	stonework
x	<i>D. filix-mas</i>					x
x	<i>Epilobium adenocaulon</i>			x		x
	<i>E. hirsutum</i>				x	x
	<i>Equisetum arvense</i>			x		
	<i>Eragrostis</i> cf. <i>cilianensis</i> (All.) <i>Lutetis</i>	x	x			x
x	<i>Erysimum cheiranthoides</i>		x	x		
x	<i>Euphorbia peplus</i>			x		x
	<i>Festuca ovina</i>		x	x		
x	<i>F. pratensis</i>		x	x		
x	<i>F. rubra</i>	x	x			x
	<i>Ficus carica</i>		x			x
x	<i>Fraxinus excelsior</i>	x	x	x		
	<i>Galeopsis tetrahit</i>	x	x	x		
x	<i>Galinsoga ciliata</i>				x	x
x	<i>G. parviflora</i>					x
	<i>Galium verum</i>		x	x		
x	<i>Geranium dissectum</i>		x	x		
	<i>G. robertianum</i>		x		x	
x	<i>Hedera helix</i>			x		x
	<i>Hirschfeldia incana</i>		x			x
x	<i>Holcus lanatus</i>			x	x	
x	<i>Hordeum murinum</i>			x		
	<i>H. secalinum</i>		x	x		
x	<i>Hypochoeris radicata</i>		x	x		
x	<i>Laburnum anagyroides</i>			x		
x	<i>Lactuca serriola</i>		x	x		
	<i>Lamium amplexicaule</i>		x			x
x	<i>L. purpureum</i>			x		
x	<i>Lapsana communis</i>		x		x	
	<i>Lepidium sativum</i>	x	x	x		
	<i>Lobelia erinus</i> L.					x
	<i>Lobularia maritima</i>			x		x
x	<i>Lolium perenne</i>			x	x	x
	<i>Lotus corniculatus</i>		x	x		
	<i>Lycopersicon esculentum</i> Mill.				x	
x	<i>Malva sylvestris</i>			x		x
x	<i>Matricaria matricarioides</i>		x		x	
x	<i>M. recutita</i>			x	x	
x	<i>Medicago lupulina</i>		x	x		
x	<i>Mercurialis annua</i>					x
	<i>Montia fontana</i>		x	x		
	<i>M. perfoliata</i>		x	x		
	<i>Oxalis corniculata</i>		x	x		
	<i>Papaver rhoeas</i>				x	x
	<i>Pastinaca sativa</i>		x		x	
	<i>Petroselinum crispum</i>	x	x			x
x	<i>Phalaris canariensis</i>					x
x	<i>Phleum bertolonii</i>		x	x		
x	<i>P. pratense</i>			x		
	<i>Phyllitis scolopendrium</i>					x
	<i>Pimpinella saxifraga</i>		x	x		
x	<i>Plantago lanceolata</i>		x		x	
x	<i>P. major</i>			x	x	
x	<i>Platanus x hybrida</i>					x
x	<i>Poa annua</i>			x	x	x
	<i>P. nemoralis</i>		x		x	
x	<i>P. trivialis</i>			x		
x	<i>Polygonum aviculare</i>				x	x
x	<i>P. convolvulus</i>			x		x



Kent (1975): common in district 7	Species observed	Infrequent species		Habitats		
		single plant	one site	culti- vated	unculti- vated	stonework
x	<i>P. cuspidatum</i>			x		
x	<i>P. persicaria</i>			x	x	
x	<i>Populus</i> sp.	x	x			x
x	<i>Potentilla reptans</i>		x	x		
	<i>Prunella vulgaris</i>			x		
x	<i>Pteridium aquilinum</i>				x	x
	<i>Pteris cretica</i> L.					x
x	<i>Ranunculus acris</i>		x	x		
	<i>R. flammula</i>	x	x	x		
x	<i>R. repens</i>			x	x	
x	<i>Rubus</i> sp.	x	x	x		
	<i>Rumex acetosella</i>		x	x		
x	<i>R. conglomeratus</i>			x		
x	<i>R. crispus</i>				x	
x	<i>R. obtusifolius</i>			x	x	
x	<i>Sagina procumbens</i>			x	x	x
x	<i>Salix caprea</i>				x	x
x	<i>Sambucus nigra</i>		x		x	
	<i>Scrophularia aquatica</i>	x	x	x		
x	<i>Senecio squalidus</i>			x	x	x
x	<i>S. vulgaris</i>			x		x
x	<i>Sisymbrium officinale</i>				x	
	<i>Solanum capsicastrum</i> Link ex Schauer	x	x			x
	<i>S. dulcamara</i>			x	x	
	<i>S. nigrum</i>			x		
x	<i>Sonchus arvensis</i>	x	x		x	
x	<i>S. asper</i>		x	x		
x	<i>S. oleraceus</i>			x	x	x
	<i>Spergula arvensis</i>		x	x		
x	<i>Stellaria media</i>			x		x
x	<i>Taraxacum officinale</i>			x	x	
	<i>Torilis nodosa</i>	x	x			x
x	<i>Trifolium repens</i>			x	x	
x	<i>Tripleurospermum maritimum</i> subsp. <i>inodorum</i>		x	x		
x	<i>Trisetum flavescens</i>		x	x		
	<i>Triticum aestivum</i> L.		x		x	
x	<i>Tussilago farfara</i>				x	x
	<i>Ulmus procera</i>		x			x
x	<i>Urtica dioica</i>			x	x	
x	<i>U. urens</i>			x		x
x	<i>Veronica persica</i>		x	x		
x	<i>Vicia cracca</i>		x	x		
	<i>V. hirsuta</i>	x	x	x		
x	<i>V. sativa</i>	x	x	x		

The habitats could be grouped roughly into three types. The first, "cultivated sites", included all gardens, windowboxes, etc., and the soil at the foot of planted street trees. The second, "uncultivated sites", was any area that had been cleared but then neglected, including building sites in use as car parks. My third category, "stonework", included pavements, cobbled mews, walls and other parts of buildings; these were the really unlikely sites for plants, yet I found 30 species that only occurred here.

Of the 157 species I recorded, seven occurred frequently in each of these three habitats. These seven were rosebay willowherb *Chamaenerion angustifolium*, fat-hen *Chenopodium album*, greater plantain *Plantago major*, annual meadow-grass *Poa annua*, procumbent pearlwort *Sagina procumbens*, Oxford ragwort

*Senecio squalidus* and smooth sow-thistle *Sonchus oleraceus*. A further nine species were also relatively widespread, but I did not find them in all three types of habitat. These were yarrow *Achillea millefolium*, daisy *Bellis perennis*, butterfly-bush *Buddleja davidii*, creeping thistle *Cirsium arvense*, Canadian fleabane *Conyza canadensis*, male fern *Dryopteris filix-mas*, American willow-herb *Epilobium adenocaulon*, bracken *Pteridium aquilinum* and broad-leaved dock *Rumex obtusifolius*.

The majority of the remaining 141 species recorded were much less widespread; 77 occurred in a single site, and 31 of these were seen as single specimens, of which eight were in leaf only and may never have flowered. Some of the most unexpected species were single specimens, often totally unexplained, like the knotted hedge-parsley *Torilis nodosa* flowering among the footing-stones of St Mary's church, Bryanston Square; or a prostrate alien grass, tentatively identified by E. J. Clement as *Eragrostis* cf. *cilianensis*, on a marble doorstep in Hill Street, Mayfair; or garden parsley *Petroselinum crispum* in Montagu Square, clinging to a shady area wall a metre or two below pavement level; or a birch *Betula* sp. about a metre tall, if rather spindly, growing out of a bare cliff of bricks and mortar in Chiltern Street, near Madame Tussaud's. Ground-elder *Aegopodium podagraria*, that noxious garden weed, was a rarity, being apparently confined to one corner of the Portman Square garden. Casuals and aliens which also came in small numbers included hairy finger-grass *Digitaria sanguinalis* and an amaranth *Amaranthus* sp., both emerging from a pavement crack in Upper Montagu Street, three plants of thorn-apple *Datura stramonium* (one of which flowered and fruited) in Manchester Square garden, and a single winter cherry *Solanum capsicastrum* on a stone doorstep in Fitzhardinge Street nearby. A small lobelia *Lobelia erinus*, sweet alison *Lobularia maritima*, and snapdragon *Antirrhinum majus*, occurred as scattered escapes from window-boxes. And, though greater plantain *Plantago major* was so frequent, I found ribwort plantain *P. lanceolata* only once: in a small building site to which it had apparently been introduced in a load of infill, together with wild parsnip *Pastinaca sativa*.

The various gardens were quite productive habitats, with a range of weeds in lawns, flowerbeds and paths. Hairy bitter-cress *Cardamine hirsuta* was predictable; less so were blinks *Montia fontana* and a dried-up lesser spearwort *Ranunculus flammula* in a flower-bed at Paddington Street Gardens, an impoverished burnet saxifrage *Pimpinella saxifraga* in a lawn behind Park Crescent, and a single withered grass in one window-box which was tentatively identified by E. J. Clement as an unusual hybrid of common bent *Agrostis tenuis* x *A. castellana*. Ninety-five of my species occurred in cultivated sites like these, and sixty, or over a third of the total, were confined to such places.

The only other really varied communities were those established in some of the uncultivated sites. The biggest and one of the oldest, having been cleared of houses some seven years earlier, was off Moxon Street, west of Marylebone High Street. The main part had been gravelled over and was in use Monday-Saturday as a car park (and as a convenience by the local dogs), but the narrow fringes of soil at the foot of the boundary walls, and the walls themselves, were surprisingly productive. I found 50 species here, including a willow *Salix* sp., and several bushes of elder *Sambucus nigra* almost two metres high. Twelve "single-site" species seen only here were *Althaea* sp. (a garden hollyhock escape, one specimen), lesser burdock *Arctium minus*, wormwood *Artemisia absinthium*, *Clematis* sp. (one specimen, possibly *C. vitalba*, but unfortunately pulled up by the car park attendants before it could be identified), beaked hawk's-beard *Crepis vesicaria*, herb-Robert *Geranium robertianum*, nipplewort *Lapsana communis*, pineappleweed *Matricaria matricarioides*, wood meadow-grass *Poa nemoralis*, elder *Sambucus nigra*, perennial sow-thistle *Sonchus arvensis* (one specimen) and wheat *Triticum aestivum*.



Kent (1975) provides interesting comparative distribution details for the whole of the vice-county. Here are recorded 1109 species of vascular plants as established, or formerly established, in Middlesex, excluding over 600 defined as casuals. Species described as "very common" (101), "common" (244) or "rather common" (20) totalled 365; a further 615 were described as "local", "rather rare", "rare" or "very rare", and 129 as "possibly extinct". Particularly relevant was Kent's division of Middlesex into seven districts, of which No 7, Metropolitan, extending from Hammersmith through Kensal Green, Highgate and Hornsey to Tottenham Hale, included London W1. For interest I compared my one-year finds in W1 with Kent's frequency records for the metropolitan district No. 7 as a whole. Of course, he was describing natural habitats, and indeed often specifically excluded "heavily built-up areas" or "Central London". However, if there was anything of a natural flora in my very restricted W1, the species should correspond broadly with those recorded as most common over the whole of district 7. This was indeed the case: 97 of my plants were among the 158 (excluding 5 Bryophyta) described specifically as being frequent, common, very common or abundant in Kent's district 7, although the comparison cannot be completely exact because of incomplete data for some plants.

I did not find Kent's remaining 61 common species; but I did find 60 others, including not only fairly predictable plants such as *Cirsium arvense*, *Epilobium hirsutum*, and *Solanum dulcamara* (given no frequency in Kent (1975)), but also some comparative rarities, such as the knotted hedge-parsley *Torilis nodosa*, recorded by Kent only once recently for district 7: from the grounds of Buckingham Palace. It was interesting that of the 30 species I found growing only on stonework (buildings, pavements, etc.), the relatively large proportion of 18 were not among Kent's "common" plants. These 18 were an amaranth *Amaranthus* sp., rape *Brassica napus* (?), yellow corydalis \**Corydalis lutea*, ivy-leaved toadflax *Cymbalaria muralis*, hairy finger-grass *Digitaria sanguinalis*, an alien grass \**Eragrostis* cf. *cilianensis*, fig *Ficus carica*, hoary mustard *Hirschfeldia incana*, henbit dead-nettle *Lamium amplexicaule*, the window-box lobelia *Lobelia erinus*, garden parsley \**Petroselinum crispum*, the alien winter cherry \**Solanum capsicastrum*, knotted hedge-parsley \**Torilis nodosa*, English elm *Ulmus procera* and four ferns—lady-fern *Athyrium filix-femina*, broad buckler-fern \**Dryopteris dilatata*, hart's-tongue *Phyllitis scolopendrium* and the alien ribbon fern *Pteris cretica* L.

"Common" species for Kent's district 7 which I did not find included eight which would have been unlikely in W1's limited range of habitats: winter-cress *Barbarea vulgaris* (noted as rare in Central London); common duckweed *Lemna minor* and fennel pondweed *Potamogeton pectinatus* (both water plants); bladder-senna *Colutea arborescens*, the hawkweed *Hieracium vagum* and garden lupin *Lupinus polyphyllus* (all three noted as preferring railway banks); and the soft and hard rushes *Juncus effusus* and *J. inflexus*. The remaining 53 "common" species included some which I should have expected to find, for example dove's-foot cranesbill *Geranium molle* and white dead-nettle *Lamium album*. Perhaps they will turn up another year: where so many species are represented by very few specimens, or only one, each year's flora could differ fairly substantially from the last. Perhaps the most important feature of this sort of inner city flora will prove to be its very impermanence, and its variation from year to year. Only time will tell.

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\* Single specimen only.



## **Freshwater Macroinvertebrates in London's Rivers 1970-77**

by K. F. A. ASTON\* and M. J. ANDREWS\*

### **Summary**

The fauna of the freshwater reaches of the Thames tide-way and of its main tributaries in London has been studied regularly since 1970. The rivers Darent and Cray, which join the Thames 29 km below London Bridge, have been studied since 1974. More than 1100 samples have been taken at 50 sites. The distribution of macroinvertebrates in the individual rivers is discussed in relation to the known pollution history.

### **Introduction**

The Greater London Council first used biological methods as a management aid in the assessment and control of water pollution in 1970. At that time they were responsible for enforcing the Rivers (Prevention of Pollution) Acts of 1951 and 1961 in the tributaries of the Thames in the London Excluded Area, as defined in the Water Resources Act, 1963. This roughly corresponded to the present day GLC area and contained rivers outside the jurisdiction of any other river authority or catchment board, i.e. the River Crane and Duke of Northumberland's River, River Brent, Grand Union Canal, the Beverley Brook, River Wandle and River Ravensbourne.

In April 1974 the Water Act 1973 was implemented, and Thames Water Authority became responsible for the Thames Catchment Area. The Metropolitan Pollution Control section (MPC) was organised within Thames Water, and took over pollution control in the London Excluded Area from the Greater London Council, in the Thames tide-way (from the Port of London Authority) and inherited a part of the area of the Kent River Authority, the drainage of which is directed to the Thames above Greenhithe, and includes the rivers Darent and Cray (Fig. 1).

The sampling points (Fig. 1) were visited four times each year. They were chosen to indicate any changes in the river fauna that might be attributed to pollution, and were thus located in the vicinity of sewage effluents, confluences of sub-tributaries, or near points of suspected industrial pollution. On several occasions when changes in animal populations were noticed and the MPC Inspectorate was informed, some previously undetected sources of pollution were discovered and dealt with. The data obtained from 1,150 samples taken on 179 occasions have been condensed and presented in Table 1.

\* Thames Water, Metropolitan Pollution Control, Northumberland House, Mogden Works, Mogden Lane, P.O. Box 7, Isleworth, Middlesex TW7 7LP.

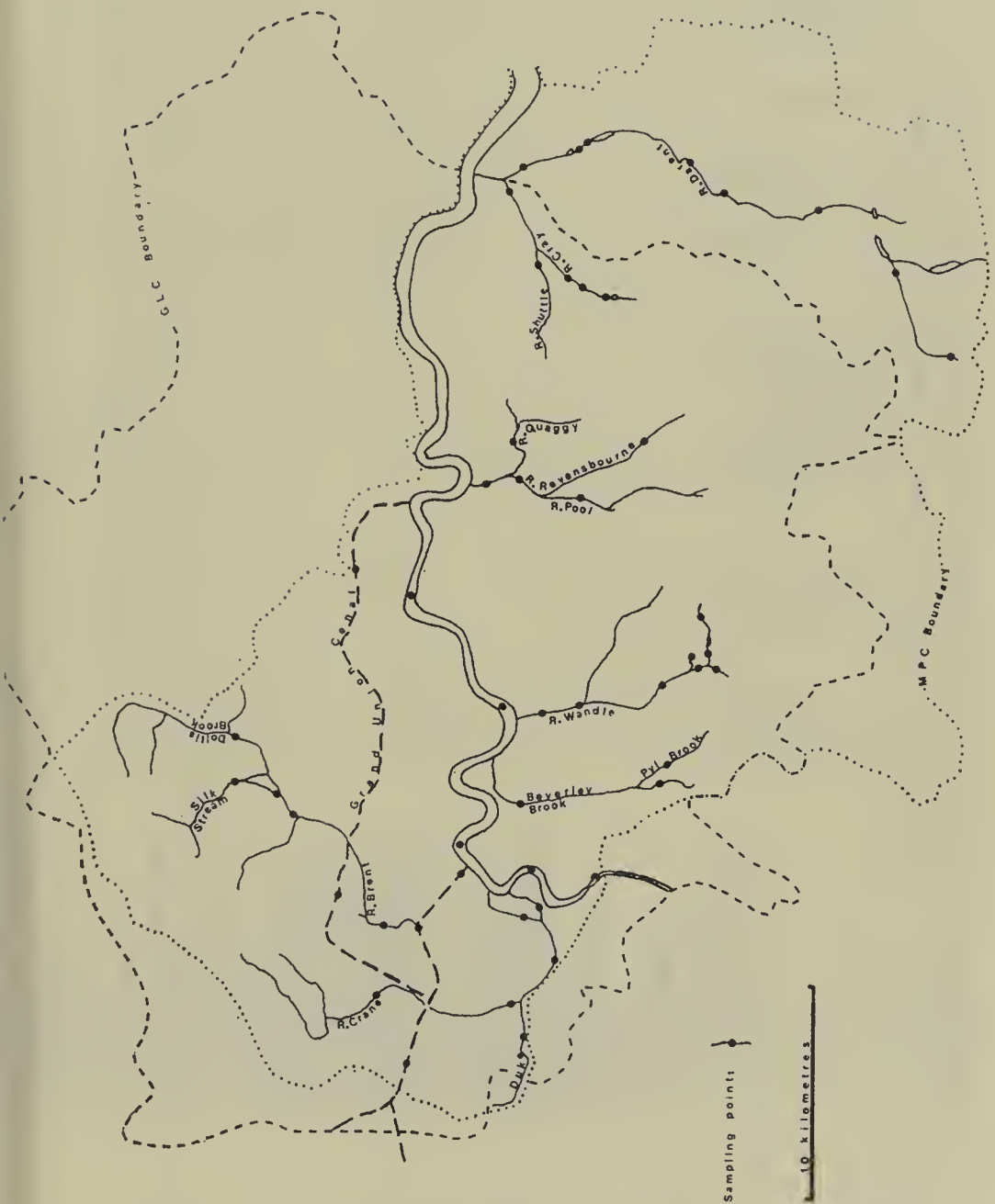


TABLE 1. Macroinvertebrates in London's rivers 1970-77, except for the Darent and Cray which is for 1974-77.  
o: species found in less than 5% of samples. +: species found in 5%-80% of samples. \*: species found in more than 80% of samples.

	Darent		Cray		Shuttle		Ravensbourne		Pool		Quaggy		above effluent Wandle		Beverley		Pyl		Crane		Duke's		Brent		Dollis Brook		Silk Stream		Grand Union Canal		Thames		
	8	77	4	48	1	12	4	104	1	26	1	26	4	116	2	58	1	29	4	90	2	60	3	84	1	28	1	28	5	104	4	144	
PLATYHELMINTHES																																	
<i>Polycelis nigra</i>					+		+		+		+		+				+		+		•		+		+		+		+				
<i>P. tenuis</i>	•		•				•		+				+						+												•		
<i>P. felina</i>			•	•			•		+		+		+	•					+		•		+		+		+		+				
<i>Dugesia polychroa</i>									+		+		+						+		•		+		+				+				
<i>D. tigrina</i>	•		•		+		•		+		+		+						+		•		+		+				+		•		
<i>Dendrocoelum lacteum</i>									+				+													+							
<i>Bdellocephala punctata</i>													+																				
<i>Dalyellia</i> sp.							+																										
ANNELIDA																																	
HIRUDINEA																																	
<i>Piscicola geometra</i>													+						+		•		+		•							+	
<i>Theromyzon tessulatum</i>																			+		•		+		•							+	
<i>Glossiphonia complanata</i>													•						+		•		+		•							+	
<i>G. heteroclita</i>													+						+		•		+		•							+	
<i>Helobdella stagnalis</i>													+						+		•		+		•							+	
<i>Hemiclepsis marginata</i>													•						+		•		+		•							+	
<i>Haemopsis sanguisuga</i>													•						+		•		+		•							+	
<i>Eryobdella octoculata</i>													•						+		•		+		•							+	
<i>E. testacea</i>																			+		•		+		•							+	
<i>Trocheta subviridis</i>																			+		•		+		•							+	
<i>T. bykowskii</i>																			+		•		+		•							+	
<i>Tubifex tubifex</i>																			+		•		+		•							+	
<i>Limnodrilus hoffmeisteri</i>																			+		•		+		•							+	
<i>L. claparedetanus</i>																			+		•		+		•							+	
<i>L. cervix</i>																			+		•		+		•							+	
<i>L. profundicola</i>																			+		•		+		•							+	
<i>L. udekemianus</i>																			+		•		+		•							+	
<i>Potamothrix hammoniensis</i>																			+		•		+		•							+	







	Darent	Cray	Shuttle	Ravensbourne	Pool	Quaggy	Wandle above effluent	Wandle below effluent	Beverley	Pyl	Crane	Duke's	Brent	Dollis Brook	Silk Stream	Grand Union Canal	Thames
	8	4	1	4	1	1	4	4	2	1	4	2	3	1	1	5	4
	77	48	12	104	26	26	116	116	58	29	90	60	84	28	28	104	144
Number of sites visited	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Number of samples	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

## Bosminidae

## Copepoda

## Ostracoda

*Argulus foliaceus*

## ARACHNIDA

*Lebertia porosa porosa**Piona conglobata conglobata*

## Others

## INSECTA

## Plecoptera

## Ephemeroptera

*Isoperla grammatica**Nemoura cinerea**Nemurella picteti**Leuctre hippopus**Dinocras cephalotes**Ephemerella danica**Caenis horaria**C. robusta**C. moesta**C. macrura**Ephemerella ignita**Ecdyonurus dispar**Heptagenia sulphurea**Leptophlebia marginata**Paraleptophlebia submarginata**Centropilum luteolum**Cloeon dipterum**C. simile**Baetis rhodani**B. scambus**B. muticus*



	Darent	Cray	Shuttle	Ravensbourne	Pool	Quaggy	Wandle above effluent	Wandle below effluent	Beverley	Pyl	Crane	Duke's	Brent	Dollis Brook	Silk Stream	Grand Union Canal	Thames
	8	4	1	4	1	1	4	4	2	1	4	2	3	1	1	5	4
	77	48	12	104	26	26	116	116	58	29	90	60	84	28	28	104	144

Trichoptera

- Agraylea multipunctata*  
*Hydroptila* sp.  
Other Hydroptilidae  
*Phryganea grandis*  
Other Phryganeidae  
*Silo* sp.  
*Goera pilosa*  
*Potamophylax latipennis*/  
*cingulatus*  
*Halesus radiatus*/*H. digitatus*/  
*Hydatophylax infumatus*  
*Limnephilus lunatus*  
Other Limnephilidae  
Polycentropidae  
*Rhyacophila septentrionis*  
*R. dorsalis*  
*Agapetus* sp.  
*Molanna angustata*  
*Ecnomus* sp.  
Other Psychomyiidae  
*Hydropsyche pellucidula*  
*H. angustipennis*  
Other Hydropsychidae  
Leptoceridae  
Hydrophilidae  
*Hygrobia hermanni*  
*Halipilus* sp.  
Gyrinidae  
*Dytiscus marginalis*

Coleoptera

	Darent	Cray	Shuttle	Ravensbourne	Pool	Quaggy	above effluent	Wandle	Beverley	Pyl	Crane	Duke's	Brent	Dollis Brook	Silk Stream	Grand Union Canal	Thames
	8	4	1	4	1	1	4	2	2	1	4	2	3	1	1	5	4
	77	48	12	104	26	26	116	96	58	29	90	60	84	28	28	104	144
<i>Deronectes depressus</i>	+		+			+			0		+	+	+			+	
Other Dytiscidae	+	+	+	+			+									+	
<i>Elmis aenia</i>	+	+															
<i>Limnius volckmani</i>	+	+															
<i>Gerris lacustris</i>	+											+					
<i>G. ? odontogaster</i>	+											+					
<i>Gerris</i> spp.	+	+		0								+					
<i>Nepa cinerea</i>	+			+								+					+
<i>Aphelocheirus montadoni</i>	+			+								+					
<i>Notonecta glauca</i>	+			+								+					
<i>N. maculata</i>	+			0													
<i>N. viridis</i>	0																
<i>Cortixa dentipes</i>	0																
<i>C. panzeri</i>	0			+								+					
<i>C. punctata</i>	+											+					
<i>Hesperocorixa sahlbergi</i>	+											+					
<i>Sigara concinna</i>	+											+					
<i>S. falleni</i>	+											+					+
<i>S. dorsalis</i>	+	+		+								+					+
<i>S. lateralis</i>	+	+										+					+
<i>S. stagnalis</i>	0																
<i>Callicorixa praeusta</i>		+															
<i>Agrion</i> sp.																	
<i>Ischnura elegans</i>																	
<i>Coenagrion mercuriale</i>			+									+					
Coenagriidae		+										+					
Corduliidae		+										+					
<i>Aeshna cyanea</i>																	
<i>Aeshna</i> sp.	+																

Number of sites visited  
Number of samples

## Hemiptera

## Odonata

	Darent	Cray	Shuttle	Ravensbourne	Pool	Quaggy	above effluent	Wandle	below effluent	Beverley	Pyl	Crane	Duke's	Brent	Dollis Brook	Silk Stream	Grand Union Canal	Thames
	8	4	1	4	1	1	4	4	2	2	1	4	2	3	1	1	5	4
	77	48	12	104	26	26	116	116	58	58	29	90	60	84	28	28	104	144

Number of sites visited  
Number of samples

- Sialis fuliginosa*
- Simulium angustipes*
- S. ? nitidifrons*
- S. ? ornatum*
- Simulium* sp.
- Ceratopogonidae
- Culicidae
- Dixa nebulosa*
- Dixella serotina* ?
- Empididae
- Limnobiidae
- Muscidae
- Psychodidae
- Tabanidae
- Tipulidae
- Tanyptus punctipennis*
- T. vilipennis*
- Macropelopia nebulosa*
- Macropelopia* sp.
- Procladius choreus*
- Procladius* spp.
- Pentaneurini
- Conchapelopia melanops*
- Brillia modesta*
- Cardiocladius* ?*fuscus*
- Isocladius trifasciatus*
- Isocladius* sp.
- Heterotrissocladius* sp.
- Orthocladius* spp.

Megaloptera  
Diptera



	Darent	Cray	Shuttle	Ravensbourne	Pool	Quaggy	above effluent	Wandle below effluent	Beverley	Pyl	Crane	Duke's	Brent	Dollis Brook	Silk Stream	Grand Union Canal	Thames
	8	4	1	4	1	1	4	4	2	1	4	2	3	1	1	5	4
	77	48	12	104	26	26	116	116	58	29	90	60	84	28	28	104	144
<i>Euorthocladius thienemanni</i>	+		+			+		+		+	*	*	+	+	+	+	+
<i>Prodiamesa olivacea</i>	+		+	+	*	+											
<i>Allopectrocladius obivious</i>	+	+		+													
<i>A. platypus</i>	0			0													
<i>Synorthocladius?semivirens</i>		+															
<i>Thienemanniella clavicornis</i>	+											+					
<i>T. vittata</i>	+																
<i>Camptochironomus tentans?</i>	+																
<i>Chironomus "thummi" group</i>	+	+	+	+		+		+	+	+	0	0	+	+			
<i>Chironomus</i> sp.	+	+															
<i>Cryptochironomus rostratus</i>	+	+														+	
<i>Endochironomus</i> sp.	+	+										+				+	
<i>Glyptotendipes</i> sp.	+	+					+					+	+				
<i>Microtendipes</i> sp.	+	+															
<i>Parachironomus</i> sp.	+	+															
<i>Pentapeditum</i> sp.	+	+															
<i>Polypeditum nubeculosum</i> group	+	+										+					
<i>Cladotanytarsus</i> sp.							+										
<i>Microspectra/Lauterbornia</i>	+			+													
<i>Tanytarsus</i> sp.																	

Number of sites visited  
Number of samples

## Methods

Invertebrates were collected at each site using the "kick" or "stop-net" technique described by Macan (1958). This essentially consisted of holding a hand-net (20 meshes/2.5 cm) against the river-bed whilst the substratum immediately upstream was disturbed by kicking, thus loosening the macroinvertebrates which were swept into the net by the current. They were also gathered from aquatic plants, stones, and other suitable substrates. The search was limited to 20 minutes, then material from the "kick" sample was taken to the laboratory for hand-sorting, together with a selection of those animals requiring further study for identification. In most cases this involved microscopic examination and sometimes necessitated the rearing of immature insects to the adult stage. Resh & Unzicker (1975) emphasised the need for species-level identification in attempting to develop water quality criteria, and organisms were identified to this level whenever possible within the limited time available. In the table of results, cladocerans, cyclopoid and calanoid copepods have been grouped together into their appropriate families. These groups could not be representatively sampled using a net of only 20 meshes per 2.5 cm, and to report the individual species which were identified in the sample examined in the laboratory would have given a false picture of the population structure in each river.

Special problems in collecting specimens were encountered in the Thames tide-way and Grand Union Canal where the water was too deep for wading. This was overcome in the Thames by visiting the shore at local low water during spring-tides. To complement these samples, a hand-operated 0.2 m<sup>2</sup> Peterson grab was used at 26 additional sites between Teddington and London Bridge. This grab was also used in the Grand Union Canal, but it has been shown that the greatest range of animals could be hand-collected when a canal section was drained for lock maintenance, and animals became concentrated in the remaining pools of water.

## Results

A list of macroinvertebrates recorded in the rivers during the seven years covered by this report is given in Table 1. The relative abundance in a river of any listed organism is indicated in the appropriate column by an asterisk (\*) if found in over 80% of samples, a plus (+) if found in 5–80%, and an o where present in less than 5% of samples.

Some animals were widespread and could be found at most sites in the region. They included the leeches *Erpobdella octoculata* and *Glossiphonia complanata*, oligochaete worms *Limnodrilus hoffmeisteri*, *Nais elinguis*, *Tubifex tubifex* and Enchytraeidae, the molluscs *Lymnaea peregra*, *Physa fontinalis* and *Potamopyrgus jenkinsi*, crustaceans *Asellus aquaticus* and *Cyclops* spp., and the midge larvae *Prodiamesa olivacea* and Pentaneurini. These are animals generally considered to be pollution tolerant—none was mentioned by Kolwitz & Marsson (1909) as being typical of non-polluted oligosaprobic conditions. Klein (1962: 404) pointed out that so-called "pollutional" organisms were not the creation of pollution, but were mostly present in normal streams and were only able to increase their population densities and extend their natural habitat range in response to polluted conditions. This was supported by findings in this survey; in the unpolluted River Darent, graded one chemically (HMSO 1971), approximately 20 *Asellus aquaticus* or *Lymnaea peregra* could be found during a 20 minute search, whereas in the River Wandle below the confluence with effluent from Beddington Sewage Works, the count might well be in excess of 1000. The relative abundance of the other widespread organisms similarly reflected the amount of organic enrichment found in each system, with increased animal densities of surviving species being associated with higher levels of organic pollution.

The fact that certain groups, such as the Plecoptera, are not evenly distributed throughout the British Isles means that biological classification systems such as those proposed by Woodiwiss (1964) or Chandler (1970) cannot readily be applied on a national level. Although both these schemes are excellent for conveying biological information to water managers and non-biologists, they were devised in areas where the rivers contained habitats ideally suited to Plecopteran species. Therefore rivers in London with very few stoneflies would "score" very low when compared to rivers, for instance, in the Lothians, even though the rivers of both regions might be chemically very clean.

To a lesser degree the same problem occurs with the Ephemeroptera. For instance, *Ephemera* spp. require fast-flowing streams with sandy or gravelly beds and consequently have only been found occasionally in London. By contrast, members of the Caenidae are well suited to the silty conditions in the area and were present in five of the nine river systems.

### River Darent

The River Darent rises in the chalk of the North Downs in Limpsfield, Surrey, and flows through predominantly open countryside for some 33 km to enter the River Thames near Crayford Ness. The final 3.5 km below Dartford Locks is tidal. The water is clean and supports a wide range of invertebrates.

Three species of Plecoptera nymphs were found on separate occasions and 12 species of Ephemeroptera altogether, although three of these, *Ephemera danica*, *Heptagenia sulphurea* and *Paraleptophlebia submarginata*, were recorded only once. Trichoptera were found throughout the river, including free-living Rhyacophilidae, Hydropsychidae and numerous case-building species. The remaining Insecta orders were well-represented and included 13 species of Hemiptera and a variety of Diptera larvae.

A wide range of Mollusca was normally present throughout the river, except during the summer of 1976 when long stretches dried out completely. However, recolonisation from the lakes was rapid when the drought ended. A speedy return was similarly observed in the Platyhelminthes, with the exception of *Dugesia tigrina* which did not reappear until the autumn of 1977. *Polycelis tenuis* occurred spasmodically at the lower end of the river, but other members of this genus (*P. felina* and *P. nigra*) were unaccountably absent.

The Annelida were well represented with nine Hirudinean species being widely distributed. Tubificids worthy of special mention for the Darent were *Aulodrilus plurisetus* and *Rhyacodrilus coccineus*, since they were fairly common, yet generally absent from the other rivers.

### River Cray

The River Cray has its source in chalk springs at St Mary Cray. It flows for 14 km before entering Dartford Creek, thence to flow with the Darent into the Thames. The flow in the 4.5 km immediately above this confluence is augmented with that from the River Shuttle which enters at Bexley.

Unlike the Darent, which flows through predominantly agricultural land, the Cray passes through a more industrialised area. Consequently accidental spillages and leakages from industrial premises into the Cray occur, and during wet periods surface water run-off into the river may be of relatively poor quality. A combination of these factors restricted the fauna of the Cray in comparison with that of the Darent, although it was still generally better than most of the other metropolitan watercourses.



Ephemeroptera were not well represented, with only *Baetis rhodani*, *Cloeon dipterum* and *Ephemerella ignita* being recorded. The first species was the only may-fly nymph found in the River Shuttle; it is more pollution tolerant than other may-flies: both Chandler (1970) and Woodiwiss (1964) separate *Baetis* from other Ephemeroptera in their classification schemes, and Roback in Hart & Fuller (1974 : 369) record species of *Baetis* which can tolerate poor quality waters having a biochemical oxygen demand (BOD) greater than 10 mg/litre, although in the River Shuttle the average is considerably lower, and the critical factor here was probably the high summer temperature of water in the culverted part of the river.

Trichoptera were generally not abundant, although where members of the Rhyacophilidae and Hydropsychidae were present, they were usually found in large numbers almost to the exclusion of the other families.

A great variety of molluscs were found in the Cray, and the lower reaches afforded ideal conditions for pulmonates such as *Ancylus*, *Lymnaea*, *Physa* and *Planorbis*. Of the prosobranch molluscs *Bithynia*, *Potamopyrgus* and *Valvata* were common, although in the Shuttle only *Potamopyrgus* was found.

The flatworms common to most of the region's rivers were found in the Cray and Shuttle, along with the less common *Polycelis felina*. The occurrence of various annelids in the rivers was unexceptional, although fewer were found in the River Shuttle, probably due to the absence of suitable substrates.

## River Ravensbourne

The Ravensbourne rises at Bromley and flows through highly developed areas before entering the Thames at Deptford Creek, a distance of 13 km. Two tributaries are received, the River Pool and the River Quaggy.

Until 1972 the upper reaches of the Ravensbourne were consistently good biologically, and even Plecoptera thrived. However, in recent years, a few minor oil leakages occurred, causing a thin film to coat the stones and plants. The origin of the spillages was traced and the leakages stopped, but their effect, coupled with the 1976 drought, could have accounted for the absence on later occasions of Trichoptera, the crustaceans *Crangonyx pseudogracilis*, *Gammarus pulex* and *Simulium* spp., all of which are relatively pollution-intolerant.

Major construction and culverting for flood relief purposes in the main river upstream of the River Pool between 1970 and 1973 caused an increased suspended solids load that smothered the animals, and many species were lost from the middle reaches. In the River Pool the quality was on many occasions poor; Diptera were the only Insecta recorded. Remedial action is under way to stop a source of ammonia-containing ground water which percolates into the River Beck, a tributary of the River Pool, at Kelsey Park, and is believed to be restricting the fauna. The quality of the River Quaggy was intermediate between that of the Pool and the upper reaches of the Ravensbourne.

The main river contained six species of flatworms, which were reduced in the River Pool to only three—*Dendrocoelum lacteum*, *Dugesia polychroa* and *Polycelis tenuis*. *Bdellocephala punctata* was recorded in the Quaggy but not in the other two tributaries. Leeches were never abundant and a total of six species was found. Of the 14 oligochaete worm species recorded from the Ravensbourne system, *Limnodrilus hoffmeisteri*, *Nais elinguis* and *Tubifex tubifex* were abundant, *Limnodrilus cervix*, *L. udekemianus* and *Nais simplex* were found commonly, and others occurred less frequently. The may-flies *Baetis rhodani*

*Centroptilum luteolum* and *Cloeon dipterum* were often seen in the main river, but have disappeared in recent years, probably as a consequence of the flood prevention work in the middle reaches. They were recorded earlier in the Quaggy, but similarly disappeared from that river at about the same time. Mollusca were restricted to five species throughout the system: *Ancylus fluviatilis*, *Lymnaea peregra*, *Physa fontinalis*, *Potamopyrgus jenkinsi* and *Pisidium* sp.—the last not found in the Quaggy. Considerable fluctuations in the population densities of *Lymnaea* and *Physa* were noted throughout the term of the survey, and it was difficult to suggest a cause. Apart from some seasonal variation in animal numbers, gross changes were encountered which were an indication of an unstable, and possibly pollution-stressed, community. Of all the river systems studied, the Ravensbourne was ecologically the least stable.

Since 1974 the most stable point biologically on the whole system was in the very lowest reaches of the Ravensbourne, where the river is tidal. A slight drop in species diversity was noted from early summer 1975 to autumn 1976, but this was considered to be due to the intrusion of brackish water from the Thames, which affected the few saline-sensitive species.

### River Wandle

The River Wandle has sources at Carshalton and Croydon, and flows a distance of 17 km before entering the Thames at Wandsworth. The river can be considered in two sections. Below Goat Bridge (TQ 279669), treated sewage effluent from the Beddington works accounts for up to 80% of the flow. Above that point the water is generally clean, although in the Croydon Arm a sporadic discharge of polluting liquor has been discovered entering the river as it passes in enclosed culvert under Croydon, and the help of the local authority is being sought to trace the source of the discharge. The natural flow in the Carshalton Arm is very small and relies largely on recirculation of water abstracted just upstream of Goat Bridge by the Sutton and District Water Company to maintain a minimum flow of about ten million litres per day.

Since 1970 there has been a gradual improvement in the aquatic fauna of the Carshalton branch above Goat Bridge. Early in the survey little other than molluscs and leeches were found, but in recent years a more diverse fauna was usually present. The substrates normally favoured by *Planorbis carinatus* and the flatworms *Bdellocephala punctata*, *Dendrocoelum lacteum* and *Dugesia polychroa* were occasionally smothered by growths of *Sphaerotilus* sp., a filamentous bacterium, but by eliminating the sources of nutrients which encouraged such growths, the problem quickly disappeared and macro-invertebrates recolonised the river-bed. The mollusc *Lymnaea auricularia* reported to be present by McCrow (1974) was not recorded, although several other species were present, including *Planorbis crista* which was not found in any other London river. During the survey it was observed that a cycle of alternate domination existed between these molluscs and the glossiphoniid leeches. The latter multiplied as they preyed on the abundant molluscs until that food supply was exhausted, whereupon their numbers rapidly declined, thus allowing the molluscs to re-establish.

The Croydon Arm, once it has passed in culvert under Croydon, emerges to flow through Beddington Park. In this stretch the fauna was restricted to only a few species, *Limnodrilus hoffmeisteri*, *Lymnaea peregra*, *Physa fontinalis*, *Tubifex tubifex* and Chironomidae. However, after several days' retention in Beddington Park Lake, and dilution with further spring water, the river recovered sufficiently to allow a wide range of invertebrates to survive. Occasionally the mayfly *Cloeon dipterum* was present, but more significantly four species of



Trichoptera were usually found together with organisms such as *Gammarus pulex*, flatworms including *Polycelis felina* and *P. tenuis*, leeches including *Piscicola geometra* and the oligochaetes *Aulodrilus plurisetus* and *Rhyacodrilus coccineus*, both fairly rare in the Metropolitan Pollution Control area. Molluscs too were abundant, and included both *Acroloxus* and *Ancylus*.

Many of these organisms were still present at the Goat Bridge sampling site which was below the confluence of the two arms, but still above the effluent channel. The aquatic plant *Elodea nuttallii* was also found there during 1976 and 1977. This is a species recently introduced into English rivers from the Netherlands, and it could possibly become as great a nuisance as the similar Canadian pondweed *E. canadensis* did in earlier years. *E. nuttallii* has already been found in the Metropolitan area at several locations, including Brent Reservoir (Welsh Harp) (TQ 211870) and the Thamesmead lakes (TQ 478803), the weed restricting boating activities at both during 1976.

The next sampling point on the Wandle system was within the Beddington Sewage Works' effluent channel itself. In 1970 difficulties arose with the treatment of sewage, which were caused by the manual workers' industrial action, and in 1971 an undesirable trade effluent discharge had an adverse effect on the treatment plant (Greater London Council 1974a). On several occasions the fauna was seriously reduced, and animals hard to find. Since 1972 a generally good effluent has been produced from the works, but there were still a few occasions when, as a result of trade effluent discharges or mechanical troubles, there was a temporary deterioration in the quality of the effluent (Greater London Council 1974b). However, the invertebrate populations found in the effluent channel since 1972 have stabilised to include large numbers of the following: *Asellus aquaticus*, *Cyclops* spp.; chironomid larvae of *Chironomus "thummi"* group and Orthocladinae; *Erpobdella octoculata*, *Glossiphonia complanata*; *Lymnaea peregra*, *Physa fontinalis*; *Dugesia polychroa*; *Tubifex tubifex* and Enchytraeidae. These organisms dominate the fauna in the Wandle for the remainder of its length.

## Beverley Brook

The Beverley Brook rises at Cheam and is joined by the Pyl Brook some distance before discharging to the Thames at Putney. The Pyl Brook consists largely of effluent from Sutton Sewage Works, and the Beverley Brook similarly contains up to 90% treated effluent from Worcester Park Sewage Works.

In 1970 and 1971 very few animals were found in either tributary, but beginning in 1972 several species appeared and in recent years the conditions in the two rivers have been more stable. The invertebrate populations in these rivers were similar to those already described in the lower Wandle, also a carrier of sewage effluent. Significant differences between the two systems were as follows: flatworms were never found in the Beverley Brook; fewer leech species were present in the Beverley and Pyl Brooks than in the River Wandle, with *Glossiphonia complanata* and *G. heteroclita* notably absent; fewer species of molluscs were found, but *Ancylus* occurred in far greater numbers in the Pyl Brook than in the River Wandle; *Crangonyx pseudogracilis* was found only in the Pyl Brook.

*Dixa nebulosa*, *Gammarus pulex*, *Haemopsis sanguisuga*, and *Daphnia* spp. were all recorded in the Beverley Brook but only from the lower reaches.



## River Crane and Duke of Northumberland's River

The River Crane rises near Harrow and is joined by the Duke of Northumberland's River, an artificial channel taking a controlled flow from the River Colne, near Harmondsworth. After about 5 km the two rivers separate, the Crane entering the Thames at Twickenham, and the Duke's about 0.5 km downriver at Isleworth.

These rivers were generally clean and supported a wide range of invertebrates. The upper Crane tended to be silty and several species of Tubificidae could be found including up to four species of *Limnodrilus*.

Further down, near Heathrow Airport, the bed was gravelly and the flow faster, allowing a wider range of species to colonise. *Asellus aquaticus* was generally found and *Gammarus pulex* occasionally, together with Coleoptera, Odonata, Mollusca and up to 10 species of Hirudinea, of which *Erpobdella octoculata* and *Glossiphonia complanata* were dominant. This was not the case until 1971, for immediately above this sampling point, flow is received from a channel draining large balancing ponds containing wash water from the airport. In the winter months this washwater contains quantities of glycol-based de-icers from the runways and aircraft, which caused a severe depletion of oxygen in the ponds and subsequently in the River Crane. However, in 1970/71 the British Airports Authority dredged the upper pond and installed nine floating aerators. As a result, during the winter of 1971 the water remained aerobic for the first time for many years and the biota in the Crane downstream of the outfall significantly improved.

The upper Duke of Northumberland's River supported a wide range of invertebrates typical of slow, weedy waters, usually with over 20 species recorded. The trichopteran *Phryganea grandis* was normally present, together with *Molanna angustata*, Leptoceridae and Limnephilidae. At least two species of Ephemeroptera were usually found plus several Hemiptera, particularly *Sigara dorsalis* and *S. falleni*.

Below the confluence of the rivers the range of organisms remained wide; the damselfly *Coenagrion mercuriale* was regularly found in this section.

After their separation, the two rivers continued to support a diverse fauna, although in the Crane this tended to be reduced due to culverting, and the Duke of Northumberland's suffered occasionally from the diversion of the entire flow to the Crane for maintenance purposes, which left the river-bed almost dry for several days.

The lowest sampling point on the Crane is less than 2 km from the Thames tide-way, which accounted for the occasional presence of *Gammarus zaddachi* at that site.

## River Brent

The sources of the River Brent are in Harrow, Hendon and Barnet. The entire course of the river lies in highly developed areas. The main tributaries, the Dollis Brook and the Silk Stream, flow into the Brent Reservoir (Welsh Harp) which has a width of between 150 m and 400 m for nearly 1.5 km. The lower reaches are canalised after the confluence with the Grand Union, and are dealt with in that section (see below).

The Dollis Brook was for the first four years of this survey in poor biological condition. Since several polluting discharges have been stopped the water

quality has improved, although certain sporadic discharges, particularly of oil, are still receiving attention. During the dry summer of 1976, probably as a result of the much reduced run-off from the roads in the area, little oil was noticed in the water and for the first time the may-fly *Cloeon dipterum* was recorded. However this species was not found in 1977.

The Silk Stream has remained fairly poor after a slight improvement in quality at the start of 1971. Dominant species in this stream were leeches *Erpobdella octoculata*, *Glossiphonia complanata*, oligochaetes *Limnodrilus hoffmeisteri* and *Tubifex tubifex* and the molluscs *Lymnaea peregra*, *Physa fontinalis* and *Potamopyrgus jenkinsi*. The upper end of the Silk Stream is at present undergoing more intensive investigation as a result of findings from this survey. This is to discover why the condition at the top end of Deans Brook, a main tributary of the Silk Stream, is biologically very good, with an abundance of *Gammarus* and some Trichoptera, while the Silk Stream itself is poor.

Some recovery of the fauna in Brent Reservoir was apparent, although draining and dredging there in 1974 caused a temporary loss of many species. Ephemeroptera *Centroptilum luteolum* and *Cloeon dipterum* were often present, together with *Crangonyx pseudogracilis* (but never *Gammarus pulex*), *Sigara* spp. and other Hemiptera, and many species of molluscs, including large numbers of *Planorbis planorbis* and *P. vortex*.

The fauna in the main River Brent reflected the urban nature of the river system; with accidental spillages from industrial premises sited along the banks it was almost inevitable that substances would enter the water that could limit the fauna. The only invertebrates regularly recorded were the widely distributed *Asellus aquaticus*, *Limnodrilus hoffmeisteri*, *Lymnaea peregra*, *Physa fontinalis*, *Potamopyrgus jenkinsi* and *Tubifex tubifex*.

### Grand Union Canal

The biological quality of the canal from the Horton Road Bridge (TQ 068801) area to its junction with the Brent has since 1973 been relatively good. At Horton Road Bridge the system includes about 40% of treated sewage effluent from the West Hertfordshire Main Drainage Authority, but as the effluent is of good quality, it has little detrimental effect. The main pollution was due to factories at Hayes discharging electro-plating wastes and coffee grounds, and a large factory at Southall discharging cereal by-products. These problems were attended to by GLC and Thames Water pollution officers and have not recurred during the last two to three years. For the final 3 km the Canal and River Brent join, and then enter the Thames at Brentford. As would be expected, the poor condition of the lower reaches of the Brent affected the canal adversely, causing a reduction in species diversity downstream of the confluence.

On the Paddington Arm of the canal the water quality was fairly good, and normally supported a diverse macroinvertebrate fauna. Flatworms and leeches were not found in great numbers, but oligochaete worms were present in abundance in the muddier stretches. Mollusca were well represented, including *Anodonta cygnea*, *Lymnaea auricularia*, *Menetus dilatatus* and *Viviparus viviparus*. *Menetus* was recorded from the canal at Brentford and is reported by Macan (1969 : 40) to be an American species first found near Manchester in 1869, which has not been previously recorded further than 32 km from that original locality.



The presence of five may-fly species in the canal demonstrated that for much of the time the water was quite clean. *Caenis robusta* was recorded in only one other river—the Duke of Northumberland's. Other frequently recorded macroinvertebrates were certain Trichoptera, Hemiptera, Chironomidae and Coleoptera.

## River Thames

The River Thames is tidal as far as Teddington Weir, and normally the water above London Bridge is fairly fresh (i.e. with a chlorion content less than 500 mg/litre) and supports a wide range of freshwater organisms. In dry periods the salinity may be sufficiently raised to cause freshwater species in central London to disappear and be replaced by brackish water animals. Andrews (1977) stated that in September 1976 the chlorinity at London Bridge reached a half-tide corrected value of 4800 mg/litre chlorion (i.e. almost 25% sea water), and listed several freshwater species that disappeared as a result.

The river-water quality is far more uniform in the Thames than in the tributaries, due to the much greater dilution of pollutants. No detectable changes in river fauna were found associated with sewage effluent discharges to the freshwater reaches at Isleworth and Kew, although short-term localised effects were known to occur in the region of storm-water outfalls between Kew and London Bridge during storm periods. These effects (for instance the loss of sensitive groups such as Ephemeroptera and *Gammarus*) were attributed to localised low dissolved oxygen levels in the water following storm-water discharges.

For much of the time the freshwater Thames provided a suitable habitat for many species. Annelida were very well represented, with seven leech species found, and 13 oligochaetes including *Aulodrilus plurisetus* which was not often recorded elsewhere. Many molluscs were recorded, of which *Dreissena polymorpha*, *Theodoxus fluviatilis*, *Viviparus viviparus* and *Unio* spp. were absent from or only rarely found in the tributaries. In the Crustacea, *Gammarus duebeni* and *G. zaddachi* have been included in Table 1; although they can be regarded as being typical of slightly brackish conditions, both have been found in the freshwater Thames (i.e. in water containing less than 500 mg/litres chlorion).

Ephemeroptera were not common in the Thames, and only two species were found: *Caenis moesta* and *Cloeon dipterum*. Trichoptera larvae were regularly found, but not in parts of the river where there was much silt.

Although it was not found during routine sampling visits to the Thames, it is worth recording here that the identifiable remains of a Chinese mitten crab *Eriocheir sinensis* were received in 1977. This crab had been taken alive by an angler from the freshwater Thames at Teddington on 2 September 1977. Andrews (1977) recorded three other specimens of this crab which were taken well down the estuary in brackish water at West Thurrock in 1976, and mentioned that before this date only two previous records existed for the species in British waters.

The authors wish to thank Mr H. Fish, Director of Scientific Services, Thames Water Authority, for permission to publish, but wish to state that the opinions are their own and not necessarily those of the Authority. They also thank Mr R. T. Kelly, Scientific Adviser to the Greater London Council, for permission to use data gathered during their employment with the GLC, and also Mr D. G. Rickard and Mr J. E. C. Steel for having greatly assisted with the work.



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# Preliminary Observations on the Terrestrial Mite Fauna of Headley Heath, Surrey

by BERNICE E. BREWSTER\*

## Summary

Two families of primitive moss-mites, Gehypochthoniidae and Atopochthoniidae (Acari: Cryptostigmata) are recorded for the first time from the British Isles. They were collected from soil samples taken on Headley Heath after the severe drought of 1976.

Headley Heath, Surrey, is an area of common land of about 25 hectares (500 acres), situated less than one km from the eastern boundary of the Box Hill Estate. Originally the heath was used for pasturing, and early in the Second World War was requisitioned for use by the militia for training tank crews, so consequently large areas of vegetation were destroyed by heavy vehicles (Bridges & Sankey 1969). In 1951 several members of the London Natural History Society started a study of the recolonization by plants of two of these denuded areas over a ten-year period, the results of which showed that by 1960, in the areas under observation, gorse *Ulex europaeus*, wavy hair grass *Deschampsia flexuosa* and fine-leaved heath *Erica cinerea* had become the dominant plants (Hillman & Castell 1960). Since then, much of the total area has become overgrown with scrub, consisting mainly of gorse, bracken *Pteridium aquilinum* and birch *Betula*, although a great deal of work is done annually in an attempt to keep this growth to a minimum. The prevalence of scrub on Headley Heath constitutes a serious fire risk, as, particularly during a dry summer, the bracken and gorse will readily ignite. In the summer of 1976 the prolonged drought caused many areas to be more combustible than usual, resulting in a number of fires, varying in their severity. One fire burnt intermittently for three or four weeks, spreading underground and eventually destroying all plant growth and charring the soil over a large area. In early September, after all fires from this area had died out, an investigation was started to determine their effect on the mite fauna of this part of the heath. Soil samples were taken at monthly intervals and the mites extracted by Berlese funnel technique. As a control, samples were made at the same time of heath which had been unaffected by fire.

The mites extracted from samples of unburnt heath comprised many representatives of the four main orders, Mesostigmata, Cryptostigmata, Astigmata and Prostigmata. Among the cryptostigmatids, which feed mainly on algae, fungi, decaying leaves and wood, were a number of primitive moss-mites belonging to two different families.

The first of these, *Gehypochthonius rhadamanthus* Jacot, 1936, family Gehypochthoniidae, was originally described from a variety of habitats, such as an old field, pasture and pine-oak woodland, in North Carolina, U.S.A. It has subsequently been recorded by Aoki (1975) who found specimens in plant litter on Mt. Hirugatake and at Jigoku-zawa, Japan. The occurrence of this species on Headley Heath is therefore the first record for the family Gehypochthoniidae in the British Isles and Europe. From the material collected between September 1976 and February 1977, over 200 specimens, mainly adults, have been identified. The second species, *Atopochthonius artiodactylus* Grandjean, 1948, family

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Atopochthoniidae, was originally described from a single specimen found in humus and moss at Mugello, near Florence, Italy. Forsslund (1956) recorded this species from coniferous forest and farmland in Sweden, and its presence on Headley Heath is the first record of the family in the British Isles, although to date only six specimens have been found.

A collection of mites representing species, genera or even families new to the British fauna is not in itself of great consequence, but it is felt that the occurrence of these two families within a small area should be placed on record.

All the specimens of *Gehypochthonius rhadamanthus* and *Atopochthonius artiodactylus* which have been obtained during this study are deposited in the collections of the British Museum (Natural History).

I would like to thank Mr H. W. Mackworth-Praed, Honorary Secretary of the Headley Heath Committee, without whose assistance this study could not have been started; also Mr D. Macfarlane and Mr K. H. Hyatt for their helpful advice. Finally, I thank Dr D. R. Davis, National Museum of Natural History, Washington, for the loan of the type specimens of *Gehypochthonius rhadamanthus*.

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# Spiders from Hampstead Heath, London

by A. RUSSELL-SMITH

*At present our Society is lacking in active arachnologists and the following article and comment are reprinted from the Newsletter of the British Arachnological Society 16:5-6 (October 1976), and 17:13 (February 1977) respectively, as being of special interest to naturalists in our area. We are grateful to Mr J. R. Parker, Secretary of the BAS, and to the two authors for permission to publish these interesting observations.*

Between March and September 1972 I made a number of collections of spiders on Hampstead Heath, on one occasion accompanied by M. Ritchie. Since a fair proportion of the species collected are not recorded for the London area\* in Locket, Millidge and Merrett (1974), a brief account of the findings is given here. The heath, which is under heavy recreational pressure, particularly in the summer months, includes three major habitat types. The largest area is covered by coarse grassland mainly on heavy clay soils and dominated by *Dactylis glomerata* and *Agrostis* spp. The whole area of which is dissected by many small streams which in places form marshy areas dominated by *Juncus* spp. Finally, much of the heath is under mixed deciduous woodland varying in age from relatively young birch scrub on sandier soils to the fully mature oak and beech woodlands of Kenwood.

During the collecting period a total of 84 species were recorded of which 30 are not recorded from the London area\* in *British Spiders* Vol. III and which are listed below. The richest area for spiders was the marshes (perhaps as a result of a lower level of disturbance than in the surrounding grassland) and in such areas the following species were abundant: *Pirata piraticus*, *Antistea elegans*, *Hypomma bituberculatum*, *Gnathonarium dentatum*, *Lophonima punctatum*, *Diplocephalus permixtus*, *Leptorhynchium robustum* and *Bathyphanes approximatus*. In the grassland areas such species as *Pardosa amentata*, *Oedothorax fuscus*, *Tiso vagans*, *Gongylidiellum vivum*, *Pocadicnemus pumila*, *Bathyphanes gracilis* and *Lepthyphantes ericeus* were widespread, but species normally swept from grass were noticeably absent with the sole exception of *Xysticus cristatus*. The fauna of the ground layer of the woodlands was very impoverished, but included occasional specimens of *Monocephalus fuscipes*, *Microneta viaria* and *Lepthyphantes zimmermani*. Some of the more unexpected species included *Ceratinella brevipes* and *Centromerus expertus* from marshy areas, *Walckenaera melanocephala* and *Pelecopsis parallela* from short grass on a sandy ridge, and a single female of *Araneus gibbosus* swept from a hawthorn bush. Including the records in Savory & Le Gros (1957) a total of 92 species have been recorded from the heath, and although there is little doubt that many more will be recorded from this rather neglected area, this figure probably includes the more abundant species.

Spiders from Hampstead Heath not previously recorded from the London area:\*

<i>Clubiona lutescens</i>	<i>Micrargus herbigradus</i>
<i>Enoplognatha thoracica</i>	<i>Diplocephalus permixtus</i>
<i>Araneus gibbosus</i>	<i>D. picinus</i>
<i>Antistea elegans</i>	<i>Leptorhynchium robustum</i>
<i>Ceratinella brevipes</i>	<i>Pelecopsis parallela</i>
<i>Walckenaera melanocephala</i>	<i>Meioneta saxatilis</i>
<i>W. nudipalpis</i>	<i>Centromerus expertus</i>

\* The "London area" referred to is the old LCC area of London.



*Dicymbium nigrum**Dismodicus bifrons**Pocadicnemus pumila**Cnephalocotes obscurus**Tiso vagans**Monocephalus punctatum**Lophomma punctatum**Gongyliellum vivum**C. sylvaticus**Oreonetides abnormis**Bathyphantes parvulus**B. approximatus**Kaestneria pullata**Lepthyphantes cristatus**L. obscurus**L. ericeus*

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## Comment by W. S. BRISTOWE

Having read A. Russell-Smith's note in *Newsletter* No. 16 of October 1976, I am tempted to ask if *Atypus affinis* is still to be found there? F. Enock, who wrote so nicely about the habits of *Atypus* in 1885 and 1892 in the *Trans. ent. Soc. Lond.*, used to find it there. Or has *A. affinis* now vanished from the London scene like *Micrommata virescens*, *Diaea dorsata*, *Pisaura mirabilis* and *Araneus marmoreus pyramidatus* which Eleazor Albin illustrated in 1736 from specimens collected in Ken Wood earlier by Joseph Dandridge? (Sloane MSS 3999, British Museum, Bloomsbury).

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PLATE 1. A male Roesel's bush-cricket in Regent's Park.

Photograph: J. P. Widgery, September 1977.

## Roesel's Bush - cricket

### *Metrioptera roeselii* in Regent's Park

by J. P. WIDGERY\*

One of the most surprising events in the London Area during 1977 was the discovery of a healthy colony of Roesel's bush-cricket *Metrioptera roeselii* (Hagenbach) in a new enclosure in Regent's Park, City of Westminster. Whilst it was difficult to judge the size of the colony with accuracy there were at times an estimated 30 males stridulating. This is easy to recognise, being a continuous reeling note delivered in long bursts of up to a minute or so. Males can be heard 'reeling' frequently during warm days and occasionally during the night between July and September or October. The insect, which was easy to locate when stridulating, is a medium-sized bush-cricket up to about 2 cm in length (Plate 1). The general coloration is a mixture of brown and green, usually with yellow markings on the sides, particularly around the margins of the pronotal side-flaps. Ragge (1965) gives a full description in his comprehensive book on the British Orthoptera.

The area in which this species was found covers less than one hectare and consists of coarse grass interspersed with approximately 120 young trees. The trees were originally planted during the winter of 1975/76 but due to the effects of the 1976 drought some 25% were lost which necessitated replanting during the winter of 1976/77. It was an open area of regularly-cut grassland, free to public access, until it was enclosed with fencing when planted in the winter of 1975/76, since when the original grass has been allowed to grow. It had always tended to hold water, remaining damp for long periods except during the height of the summer, this being apparently due to its situation in a very slight depression. The habitat thus created ideally suits this species which naturally occurs in coarse grassland, particularly in flat estuarine localities. Payne (1957) found that the species' occurrence in the London Area was restricted to a belt on either side of the Thames below Woolwich where the dominant vegetation was long grass. However, there was an old early 19th century record at Hampstead cited by Lucas (1920), this being within 3 km of the present record. Payne (loc. cit.) expressed the view that *Metrioptera roeselii* may formerly have been widespread along the lower Thames valley, extending some way up the high ground on either bank, but the development of London has broken the continuity of its range towards the west. It is possible, therefore, that the species did once occur naturally in the area.

The current Biological Records Centre distribution maps show the species to be locally distributed in the British Isles, being recorded in only 12 vice-counties prior to the record under discussion. These include two recent surprising records, one of a single male at Totteridge (V.C. 20; 51/29) and the other of a small colony in Dyfed, Wales (V.C. 46; 22/69), the latter being far outside the normal range of the species, which had previously been known only from east and south-east England. It is believed that the insect could have been accidentally introduced in the Welsh locality, being brought across from Lincolnshire on transport operated by landowners in the vicinity (Ragge 1973). More recently, however, the insect has been recorded in Ireland by Anderson (1977) who, on 26 August 1976, found stridulating males on a grassy dyke on the estuary of the Blackwater in Co. Waterford.

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The occurrence of the species in Regent's Park, which constitutes a first record for Middlesex, V.C. 21 (51/28), is believed to be due to accidental introduction. Soil brought from Ongar in Essex, which is a good locality for *Metrioptera roeselii*, was used for planting the first trees during the winter of 1975/76. It is thought that the soil involved probably contained eggs of the species, although the cricket was not noted during 1976 which was exceptionally hot and dry, and therefore probably not conducive to the creation of the type of conditions the species requires. It would appear, therefore, that the eggs had at least a two year incubation period. This adds further weight to recent observations which have confirmed that it is not unusual for bush-cricket eggs to take two seasons to hatch. This could be of value as a protection against the occasional freak season (Ragge 1973).

The identity of specimens taken in Regent's Park was confirmed at the British Museum (Natural History) and a male and a female have been deposited in the national collection.

It was also interesting to find lesser marsh grasshopper *Chorthippus albomarginatus* in the same locality in Regent's Park, which according to Payne (1957) had a similar local distribution to *Metrioptera roeselii*; this is another new record and joins meadow grasshopper *Chorthippus parallelus* and common field grasshopper *C. brunneus* to the list of grasshoppers recorded for Regent's Park.

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# Rainbow Trout in the Tidal Thames

by ALWYNE WHEELER \*

The rainbow trout *Salmo gairdneri* Richardson, 1836, is a fish native to the western coastal regions of North America. Because it is a popular sporting and food fish, it has been widely redistributed by man in North America, temperate South America, Europe, Australia, New Zealand, Japan and southern Africa. Its adaptability to different environments, tolerance of less than very good water quality, and an enhanced growth rate, result in its being more suitable for culture in fish farms than the native European trout *Salmo trutta*. However, despite large scale introductions in the British Isles, it has established relatively few successful breeding colonies; Frost (1974) reported over 500 waters containing the species in Britain and Ireland of which only five are known to contain self-sustaining populations, although small-scale breeding has been reported in other waters. None of these are in the London area.

Like the native trout, the rainbow trout is comprised of migratory and non-migratory forms. In North America the migratory form is known as the steel head trout (equivalent to the European sea trout), while the non-migratory form is known simply as rainbow trout (equivalent to our brown trout). Rainbows living in large lakes are usually known as Kamloops trout in North America, which is equivalent in the British species to the 'ferox' trout. These three types are not recognized as taxonomically distinct today. The fish originally introduced into the British Isles were of the non-migratory form, although it has been suggested (Frost 1974) that some steelheads may have been imported from Europe and been inter-bred with rainbows in captivity. It is of some interest that despite the wide distribution of this species in Britain, very few migratory fish have ever been captured.

The rainbow trout is stocked in a number of reservoirs in the London area administered by the Thames Water Authority, and in other, smaller waters. However, captures of rainbow trout in the tidal Thames, that is downstream of Teddington Weir, in 1977 and in earlier years indicate that there must be a substantial number living in the river. Their origin is not certainly known, but it must be presumed that they have escaped from one or more of the stocked fisheries in the lower Thames basin.

The following authenticated records for 1977 can be cited; the asterisked records are of specimens examined by the author. All were captured by anglers, using a variety of baits from maggots to cheese.

4 June	West India Dock, London Borough of Tower Hamlets	fork length 220mm (8·7in)*
8 June	Leigh Creek, Leigh-on-Sea, Essex	fork length 270mm (10·6in)*
early July	Sunbury, Middlesex	weight 963gm (2lb 2oz) <i>Angling Times</i> 13 July 1977
21 July	20m from Gravesend Ferry, Kent	standard length 285mm (11·2in)*
2 August	Tilbury Dock, Essex	fork length 400mm (15·8in)*
10 August	Putney, London Borough of Wandsworth	standard length 325mm (12·8in)*
11 September	foreshore at Royal Naval College, Greenwich	fork length 318mm (12·5in)*
early Dec'ber	just below Teddington Weir, Richmond	weight 1·137kg (2lb 8oz) (J. Wade pers. comm.)

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Earlier records from the Thames are as follows:

1968	December	Richmond	weight 680gm (1lb 8oz) <i>Angling Times</i> 19 December 1968
1972	18 January	Fulham, London Borough of Hammersmith	fork length 356mm (14ins)
1975	17 April	Brentford, London Borough of Hounslow	total length 520mm (20·5ins), weight 1·580kg (3lb 5oz)
	28 May	West India Dock, London Borough of Tower Hamlets	fork length 292mm (11·5)*
	15 October	Millwall Dock, London Borough of Tower Hamlets	two, fork lengths 330, 343mm (13, 13·5ins)*

In 1975 between mid-June and early December 12 rainbow trout were caught along the 200 metres at Strand-on-the-Green, Kew Bridge. The smallest was 453 gm (1 lb), the largest nearly 1·246 kg (2 lb 12 oz). Five were caught in June-July and seven in November-December, which suggests that they tend to keep in schools within the tide-way (C. Colman pers. comm.). A similar observation was made by the captor of the Gravesend fish who observed schools of between 50 and 300 fish which were thought to be rainbow trout (W. Mander pers. comm.).

These records are of some interest because despite extensive study of the fishes of the tidal Thames (Wheeler 1969, and unpublished notes) the rainbow trout had never been reported before, although the native trout were caught on a number of occasions. They have, however, an additional interest in that those at Tilbury Docks, Gravesend and Leigh Creek were caught in estuarine water of relatively high salinity, and rainbow trout in even dilute sea water are uncommon in Britain. There was no evidence that they were of the migratory, or steel head, form, as all appeared to be typical of the densely black-spotted, rainbow-sided, non-migratory rainbow trout.

Rainbow trout have been found in the sea on a number of occasions around Britain. Shearer (1975) recorded four fish between August 1971 and May 1973 on the Scottish east coast between Bervie, Kincardineshire, and the southern shore of Montrose Bay, Angus; all were large fish, length range 435–650mm (17–26 ins), and bright silver in colour. On 12 August 1977 a rainbow trout of 373mm (14·7 in) was caught in the Hampshire Avon, near Christchurch, which had sea lice *Lepeophtheirus salmonis* (Krøyer, 1837) on it, thus proving it had been in the sea (R.H.K. Mann pers. comm.). This report, and the records from Scotland, seem to be the only evidence of sea-going by the rainbow trout in Britain, although the downstream records from the Thames almost qualify for this category.

I acknowledge with thanks the numerous anglers who brought me Thames-caught rainbow trout for identification. I am especially indebted to Mr B. MacGregor and Mr W. Mander for information on the Leigh Creek and Gravesend specimens, and Mr Colin Colman for information on the Strand-on-the-Green fish.

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# Survey of Bookham Common:

THIRTY-SIXTH YEAR

Progress Report for 1977

General (G. Beven\*)

During 1977 a number of new conservation management projects have been carried out in addition to the routine work. The National Trust Keeper has been much helped by volunteers, including working parties from such groups as the "Friends of Bookham Common", the First and the Third Bookham Scouts, Howard of Effingham Comprehensive School, First East Putney Venture Scouts, Cuddington Girl Guides Group, and Tanners Hatch (Youth Hostel). Some important changes in the ponds are mentioned below, and in addition South-east Pond was cleared of overhanging trees and opened up. Coppicing of hazel was continued in Eastern Wood, the total coppiced area now covering nearly four acres (ref 613, 616, 619, 621, 624, 627).

Peter Holland has brought out an up-to-date list of fungi for the common, incorporating records from various sources. He has kindly presented a copy to the Castell Research Hut library.

During August several members of the survey team generously made extra visits to put in some hard work repainting and cleaning the Research Hut.

## Vegetation: the Ponds after Conservation Management

*Isle of Wight Pond* (G. Beven and Bryan R. Radcliffe†)

By 1972 the Isle of Wight Pond had become choked with scrub vegetation to the extent of losing much of its open water. Most submerged water-weed had disappeared; there was a deep bottom layer of mud and an oxygen deficiency. The molluscs were dramatically reduced. During the winter of 1972-73 the pond was excavated with heavy machinery, removing large quantities of mud and some clay. A small island was created as a haven for birds. After closing the outlet on 2 February 1973 the pond gradually filled with water and by 15 May there were many rotifers, while in June there was a fine show of *Ranunculus peltatus*, with abundant Crustacea, mosquito larvae and other insects. In July 1973 *Potamogeton natans* spread to dominate the whole pond. Insects were plentiful, the first dragonflies appearing in September. The bottom fauna was sparse throughout the year presumably because of removal of the mud. (See *Lond. Nat.* 53: 73-74 (1974).

In April 1974 *Ranunculus peltatus* was again plentiful and was succeeded by *Potamogeton natans* which spread so thickly across the pond that in some areas small moorhen chicks were able to run over the floating leaves more quickly than they could swim among them. Little grebe and mallard also nested. In 1975 there was similar plant cover; so extensive in fact that in July a Thames Conservancy Fishing Inspector suggested that some weed be cleared from the pond. In September the Keeper removed some *Potamogeton* and a lot of blanket weed (algae). Little grebe, mallard, moorhen and coot all nested while a pair of mute swans reared two young. However, in 1976 the water plants completely failed to appear except for small patches of *Myriophyllum*. Mute swans did nest and hatched four cygnets but the whole family frequently walked away from the pond to feed and in June they finally left, the cygnets being still unable to fly and apparently starving. Swans feed mainly on water plants although they

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also take some insects, molluscs and "worms". Swans are known to cause long-term damage to aquatic vegetation and may well have contributed to the destruction of their own water-plant environment.

In 1977 the pond appeared to be devoid of true aquatic plants, although marshland species around the margins were reasonably well represented. The water was sufficiently turbid with suspended clay to obscure observation of the bottom at depths of more than 20 cm. In September 1977 a survey was carried out to establish what, if any, aquatics were present. A grapnel on a long line was used from the margins, dragging at peripheral intervals of about 10 metres. This confirmed the virtual absence of water plants. The only true aquatic found was a limited quantity of a non-flowering *Myriophyllum* species, probably *M. alterniflorum*, and most of this was in a detached, moribund condition. One tiny fragment of a water crowfoot was observed floating at the outlet end of the pond. It could have originated in the pond but is more likely to have been washed down from one of the upper ponds where *Ranunculus peltatus* remained abundant. Two other species were observed, submerged in shallow water by the north-east margin. These were *Callitriche stagnalis* and *Rorippa nasturtium-aquaticum* s. lat. Both are more properly regarded as marshland plants and were rooted in an area that was above the normal water-line. Their inundation was no doubt a temporary matter as a result of heavy rainfall in the preceding month.

The pond water in 1977 had a pH value of 6.3 which should be well within the range of tolerance of many aquatic plants. The water comes partly from surface drainage from the surrounding woodland, but mainly from a small stream originating in a spring and coming via Upper and Lower Eastern Ponds, both of which have abundant vegetation.

According to local anglers there are plenty of fish in Isle of Wight Pond, chiefly crucian and common carp but also rudd and perch. The fish are healthy but as the Fishery Inspector pointed out, they are mostly small. For instance one 'five-year-old' fish examined was only about the size of a 'one-year-old'; presumably this was because of food shortage.

In July 1977 Ben Arthure reported that the invertebrate pond life remained rather scarce, although Crustacea, insect larvae and rotifers were quite plentiful; molluscs and "worms" were not found, and algae were scarce. On 30 October John Coles found the invertebrate life to be similar except that "worms" were then quite common, including rhabdocoel turbellarians, nematodes and oligochaetes. It is of special interest that the Naididae (Oligochaeta) were quite plentiful, this being an indication that the water was not heavily polluted. In addition the colour of the water-fleas did not indicate lack of oxygen. Mrs Jenny Moore also examined the water and found microscopic plant life still scarce, there being only a few algae and diatoms. Mallard, moorhen and coot bred, but no grebes or swans.

Various theories have been advanced to account for the present lack of aquatic plants but none can at the same time explain the spectacular, albeit brief, efflorescence of these from 1973 to 1975. It seems likely that the major disturbance of the winter of 1972-73 provided the basic driving force for the change, but it is probable that a complex of factors is involved, and we may never be able to give a satisfactory explanation. Large bodies of shallow water are unlikely to remain without aquatic vegetation indefinitely unless subject to continuing chemical or thermal pollution or mechanical disturbance, so it is reasonable to expect recolonisation in due course. However, at the moment there is no evidence to suggest that recovery has commenced.



*Upper and Lower Eastern Ponds* (Bryan R. Radcliffe)

The other two major ponds were also examined in September 1977. Both were rich in aquatic and marsh plant species, although in the former the advance of *Salix cinerea*, particularly from the northern and eastern sides and its establishment within the pond itself, will necessitate clearance work in the near future. The exuberant growth of *Typha latifolia* and *Equisetum fluviatile* is also likely to need some restraint.

For variety of plant life the finest of the ponds at present is Lower Eastern. In July 1976 it was partially cleared of encroaching scrub, and broad scraped margins were left on the northern and southern sides. With a view to eventually deepening the pond it was temporarily drained in April 1977, leaving a marsh which developed a very fine flowering display of *Ranunculus peltatus*, together with abundant *Potamogeton*, *Glyceria*, *Myosotis*, *Alisma*, *Sparganium*, etc., in the pond. In midsummer, *Scutellaria galericulata* had been very fine, at which time Mrs J. E. Smith discovered *Ranunculus trichophyllus* a very local species. On the southern margin, partially shaded by the adjacent oak-wood, the September dominants were the twin bright yellows of *Ranunculus repens* and *R. flammula*. On the sunnier northern margin a fine emerald 'lawn' of *Juncus* seedlings was established, and farther from the water's edge an assemblage of plants so diverse that none was dominant. Prominent among these were three species each of *Carex*, *Epilobium* and *Polygonum*. Two species of *Bidens* were to be seen, together with *Mentha aquatica*, *Lycopus* and much *Veronica scutellata*.

Natural transitions in this area from open water to climax woodland give the appearance of following the normal course of events, but because of the close proximity of seed parents and massive leaf accretion the succession is no doubt much accelerated. In order to maintain the floristic diversity, management operations need to be relatively frequent. It is probable that total marginal clearance of trees and shrubs will be beneficial at any time as far as a pond flora is concerned. However, bearing in mind the deterioration of Isle of Wight Pond, the removal of herbaceous vegetation and mud from the pond itself may require more circumspection. Possibly, in order to maintain the greatest diversity of plant and animal life, it would be prudent to excavate no more than perhaps one third of the area of a pond-bottom in any year, moving on to the remaining fractions in subsequent years.

*Eastern and Western Hollows* (Bryan R. Radcliffe)

In recent times there have been two 'hollows', through which a small connecting stream flowed, between Lower Eastern Pond and Isle of Wight Pond. These hollows were formerly ponds but neglect over a long period of years resulted in them becoming silted up and overgrown. Although the ground was still wet they were in a fairly advanced stage of succession to forest. In the summer of 1977 work commenced to restore their former state by the removal of all trees and shrubs, shallow excavation of the soil and reformation of the derelict downstream banks. Islands and a peninsula were created in the upper area. Both were of substantial size, broadly rectangular in outline.

The work was completed in August 1977 and substantial rainfall during the autumn soon completed the filling. A former feature of Bookham Common, namely the chain of five connected ponds, is thus restored. The study of the subsequent colonisation of the two new ponds by plant and animal life will be a fascinating exercise and we hope that new members will be inspired to come forward and undertake this very worthwhile study.



## Vegetation: Bryophytes (R. C. Stern\*)

The following species are either new to the lists in *Lond. Nat.* **54**: 52–55 (1975) and *Lond. Nat.* **56**: 72 (1977) or have been found in new localities. The code for areas and habitats follows Miss Hillman's paper in *Lond. Nat.* **54** (1975).

Mosses	Areas	Habitats	Remarks
<i>Atrichum undulatum</i> (Hedw.) P. Beauv.	G	6b	
<i>Fissidens exilis</i> Hedw.	D	2a	
<i>F. taxifolius</i> Hedw.	P	6b	
<i>Ceratodon purpureus</i> (Hedw.) Brid.	R	3	
<i>Pseudephemerum nitidum</i> (Hedw.) Reim.	DEFK	6a	
<i>Dicranum scoparium</i> Hedw.	CD	6b, 7a	
<i>Pottia truncata</i> (Hedw.) Fühnr.	D	2a	
<i>Barbula recurvirostra</i> (Hedw.) Dix.	M	3	
<i>Pohlia delicatula</i> (Hedw.) Grout	O	1C	
<i>Bryum rubens</i> Mitt.	R	2b	
<i>Aulacomnium androgynum</i> (Hedw.) Schwaegr.	EJR	7	
<i>Zygodon viridissimus</i> (Dicks.) R. Br.	O	7a	2nd record: on old <i>Sambucus</i>
<i>Orthotrichum diaphanum</i> Brid.	O	7a	On old <i>Sambucus</i>
<i>Amblystegium serpens</i> (Hedw.) B., S. & G.	PS	7a	
<i>Brachythecium rutabulum</i> (Hedw.) B., S. & G.	K	6a	
<i>B. velutinum</i> (Hedw.) B., S. & G.	R	8	1st recent record
<i>Plagiothecium denticulatum</i> (Hedw.) B., S. & G.	R	7	
<i>P. succulentum</i> (Wils.) Lindb.	A	1c	New record
Liverworts			
<i>Lunularia cruciata</i> (L.) Dum.	RS	1c	
<i>Lophocolea cuspidata</i> (Nees) Limpr.	D	7	
<i>L. heterophylla</i> (Schräd.) Dum.	AD	7	
<i>Frullania dilatata</i> (L.) Dum.	O	7	On old <i>Sambucus</i> 2nd recent record

## Beetles in a Disused Owl's Nest (Richard Jones†)

Early in 1977 a large branch broke from an oak close to the Isle of Wight Pond (571). A hole in the branch was thus opened about four metres up, and on 13 March, among the wood dust at the bottom, a number of beetles were found. Their identity suggested that the hole had been used as an owl's nest. There were four staphylinids, at least two of which are known to occur in birds' nests: the local *Philonthus subuliformis* (Gravenhorst) and the rare *Xantholinus angularis* (Ganglbauer). The two others were *Quedius brevicornis* (Thomson) and *Q. maurus* (Sahlberg). Also present was *Nemadus colonoides* (Kraatz), a very local leiodid characteristic of wood mould beneath birds' nests in hollow trees. Two rare histerids were collected, *Dendrophilus punctatus* (Herbst) and *Gnathoncus schmidtii* Reitter, the first being recorded from birds' nests and stored food, while the second is apparently specific to owls' nests. All these beetles seem to be relatively rarely collected, possibly because these rather inaccessible nest holes are seldom investigated.

## Amphibia: Newts (David Stiles‡)

### A Pond Survey

The Eastern Plain gun-pits were examined for newts between March and May 1977. Crested newts *Triturus cristatus* were fairly common in gun-pit A (587) and both crested newts and smooth newts *T. vulgaris* were fairly common

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in gun-pit C (823), where palmate newts *T. helveticus* also occurred. It is remarkable that these findings are so similar to those of A. L. Panchen in 1950 (*Lond. Nat.* 30 : 42-44 (1951)), with the exception that in 1950 crested newts were not found in gun-pit A. Neither in 1950 nor in 1977 were any newts found in the other seven gun-pits. These gun-pits usually dry out completely by mid-summer. This is unfortunate, as young crested newts require five months for full development and may not be ready to leave the water until the end of August, whereas young smooth newts may leave in late June. Presumably therefore the young crested newts frequently perish, and it is of interest that the species is still present after 27 years. Both gun-pits A and C are within 200 metres of the permanent water in the Isle of Wight Pond, where the species has been recorded, so that some recolonisation may occur. On the other hand, in 1977 crested newts were not found in Crater Pond where they had been numerous in 1950, although palmate newts were still common and smooth newts fairly common in 1977. Crater Pond also frequently dries out by mid-summer and is 300 metres from the Isle of Wight Pond.

Both palmate and smooth newts were present in Sheepbell Pond, where on 18 May a grass snake *Natrix natrix* was watched apparently lying in wait for the newts, floating in open water or hidden among the weeds. The snake was caught and found to be a young male, rather slim and in need of food. When released it immediately returned to the water and hid among the weeds as before.

During conservation operations on 4 November, a hibernating newt, probably palmate, was inadvertently dug up from the dam of Lower Eastern Pond. The sleepy newt was found in the earth 7.5 cm below the surface (Nigel Davies).

### *Identification of Female Smooth and Palmate Newts*

The females of smooth and palmate newts are difficult to distinguish. Malcolm Smith (*The British Amphibians and Reptiles* (1973)) gives as the only reliable difference the presence of dark spots (black or brown) on the throat of the smooth newt and absence of them in the palmate newt. However occasionally the throat spots are very faint or even absent in female smooth newts. It may therefore be of interest that of about 200 palmate newts which I have captured in both Berkshire (near Wokingham) and in Surrey (Bookham, Esher, Horsell, Wisley) every one has shown one or two small whitish spots on each leg near the feet. I have not found these spots on any smooth newt, so that their presence may be a useful distinguishing feature.

### **Birds (G. Beven)**

#### *Population Studies in Oak-wood*

The breeding season census was repeated in the 16 hectare sample of dense interior pedunculate oak-wood (Eastern Wood) in 1977. On the whole the population remains stable.

#### *Population Studies in Scrub and Grassland*

The breeding season census was repeated in 39 hectares of scrub and grassland in 1977 (G. B. and W. D. Melliush). Changes in population occurred in the following species, the figures being the numbers of territories for 1974, 1975, 1976 and 1977 respectively. Increases were recorded in woodpigeon, 6, 3, 8, 9; green woodpecker 1, 2, 1, 3; jay 8, 5, 8, 9; song thrush 19, 16, 15, 21; robin 25, 26, 32, 34; chiffchaff 4, 4, 4, 7; and chaffinch 15, 14, 10, 15. Decreases were recorded in turtle dove 10, 8, 13, 11; great spotted woodpecker 0, 1, 3, 2; great tit 16, 14, 18, 12; coal tit 12, 9, 15, 10; long-tailed tit 7, 4, 6, 3; mistle thrush



4, 2, 2, 1; nightingale 2, 2, 6, 3; grasshopper warbler 3, 2, 2, 0; garden warbler 5, 3, 8, 6; whitethroat 13, 7, 16, 8; lesser whitethroat 3, 4, 5, 4; willow warbler 21, 24, 37, 28; dunnoek 14, 8, 13, 9; redpoll 3, 1, 1, 0; bullfinch 8, 9, 10, 6; and reed bunting 4, 5, 3, 2.

### *Effect on Birds of the Prolonged Drought in 1976*

The summer of 1976 was unusually dry and hot (*Lond. Nat.* 56 : 71 (1977)). The general impression that some garden birds were reduced in numbers during the autumn was supported by the garden bird feeding site study of the British Trust for Ornithology between October 1976 and March 1977 (B.T.O. News 84, 85 and 88). Birds most affected were said to be great tit, blue tit, coal tit, wren, song thrush and blackbird. However, it was pointed out that the abundance of wild fruits in hedges and woods might have encouraged birds to ignore garden feeding sites.

At Bookham the number of blackbirds counted on the 39 hectares of scrub and grassland was in fact lower in late autumn and winter 1976-77 than in any year since 1966, in spite of very good crops of hips, haws and sloes. However, by the following spring (1977) not only were the numbers of blackbird and wren territories in the oak-wood and scrub-grassland census areas not significantly reduced, but the song thrush figures had actually increased. Among the other species some decreases did occur (e.g. *Parus* tits and as shown above) although these were not necessarily due to the drought. Nevertheless apart from some warbler populations which tend to fluctuate widely, the decreases were not great and it seems that although some birds probably died during the drought, there was sufficient excess of population to take up most of the vacant territories in the following spring.

### *Other Notes on the Birds*

Two male tufted ducks were present on the Isle of Wight Pond during June 1977 (N. Davies, G. Whitehead). Pairs of mandarin duck were observed in at least five localities; one pair was with two ducklings on Lower Eastern Pond on 27 April (N.D.). A sparrowhawk seized a blackbird from a garden lawn close by the common on 1 July (G.W.). There were four kestrel's eggs in a nest box 10 metres up on 18 April; four chicks were present on 13 June (N.D.). A moorhen attacked by three coot on Isle of Wight Pond on 9 July was found to have fisherman's line binding its legs and round its neck, with a fish hook lodged in the beak. On release it flew off strongly, however (G.W.). Other examples of birds caught by fisherman's lines are given in *Lond. Nat.* 55 : 22 (1976)). A jack snipe was disturbed from Bayfield Pond on 16 January (N.D.). There were at least three woodcock territories including two nests; one had four eggs (ref. 23) on 15 May (N.D.) and an adult had two chicks (644) on 20 May (Oliver French). Barn owls were reported in January and March (C. Kunesch, G.W.), and little owls in February, March and October 1977.

### *Mammals (G. Beven)*

Oliver French continued his survey of the rabbit *Oryctolagus cuniculus*, studying habits and comparing distribution with Michael Towns' survey 1969-70 (*Lond. Nat.* 51 : 55-62 (1972)). We are most grateful for advice from Dr A. M. Tittensor, of the Ministry of Agriculture, Fisheries & Food, when he visited the common on 9 December. From mid-October onwards about ten rabbits were seen suffering from myxomatosis; previous epizootics occurred in 1954, 1966, 1974, and 1976. On 13 February a male dormouse *Muscardinus avellanarius* was caught in its nest which was on the ground at the foot of an oak tree, ref. 5683 (Simon McCaffrey and Nigel Davies). The nest was made of thin



strips of bark and measured  $7.5 \times 10$  cm. As it was still well within the hibernating period, the dormouse was kept indoors by the Keeper and not released until 11 May. During this period it ate mainly hazel nuts, but only those already shelled! The only previous record was that of a skull in the pellet of a tawny owl in 1964 (ref. 617) (*Lond. Nat.* 44:113-114 (1965)). On 5 June a weasel *Mustela nivalis* climbed on to a blackbird's nest one metre up in a hawthorn while the hen bird cried out in alarm (ref. 645). The weasel was after the eggs, as these were found to be smashed (N.D.). On 3 July a family party of six weasels was hunting by Lower Eastern Pond. A badger *Meles meles* was seen crossing the Cobham Road (Sq. 32) on 26 February (per N.D.). There were at least eleven sightings or footprint records of roe deer *Capreolus capreolus* during the year.

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## Book Review

*Atlas of Breeding Birds of the London Area.* Edited by David J. Montier for the London Natural History Society. 288 pp, 123 maps and diagrams, 120 line drawings. B. T. Batsford, London. 1977. £12.50. (£10.00 incl. postage to members).

When the society took part in the national atlas of breeding birds 1968-72, organised by the British Trust for Ornithology on a 10-kilometre square basis, it was decided to cover the London Area using  $2 \times 2$  kilometre square units or tetrads, thus producing 25 times more detail. The overall coverage was adequate despite some conspicuous gaps, notably in outer and south Essex. However, only 14 tetrads were not visited. The book depicts the distribution of each of the 120 species in red dots on a whole page background map skilfully drawn by K. C. Osborne. Although the London Area is bounded by a circle centred on St Paul's Cathedral with a radius of 32 km (20 miles), in order to make the boundary correspond more exactly with tetrad lines the circle has been amended to become a stepped polygon with 856 tetrads. The main built-up areas and river systems are indicated. On each facing page is a discussion of the findings in relation to known changes in distribution, population and ecology of each bird in recent years. There are most attractive line drawings of every species by L. Baker, B. Bland, P. J. Grant, A. S. Parker and R. E. Turley. Introductory chapters deal with geology and habitats. Contributors to the authoritative text are R. J. Chandler, J. G. Francis, A. Gibbs, P. J. Grant, R. C. Homes, F. H. Jones, D. J. Montier, Mrs Mary Montier, P. J. Oliver, K. C. Osborne and R. F. Sanderson. Of course many members took part in various ways, not least some 450 observers.

The result is an excellently produced book with something of special note on every page. In relation to distribution, many points of interest arise, especially the effects of the vast central built-up area and of the river systems. Thus besides showing the whereabouts of many local species, the distribution of such rural birds as stock dove and turtle dove contrasts strongly with that of strictly town birds like the rock dove. The woodpigeon, originally a woodland species, has adapted well enough to breed in central London. So far the collared dove has only occupied the outskirts of London, and Stanley Cramp in the foreword asks why this is so, when in other cities it competes successfully with woodpigeon and rock dove. Rooks have retreated from the built-up areas but remain in the rural periphery. On the other hand, magpies and jays have spread towards the city centre. The blackbird, wren, starling and house sparrow occur almost everywhere, but how sparsely scattered are the nightingales and hawfinches.

This beautiful book should be in the hands of everyone interested in London's birds, although the high price may deter many. However, such an important landmark will certainly be used as a standard for comparison for many years to come.

## Conservation in the London Area 1977

by ANNE MCCORD\*

The London Nature Conservation Committee continued with its efforts to combat some of the threats to the natural history of London. The committee was at full strength during the year and met on six occasions under the chairmanship of Mrs L. M. P. Small. Its members represented a wide variety of interests from many different areas of London, and was pleased to welcome new members from the Greenwich Wildlife Group, the Epping Forest Conservation Volunteers and the Wren Conservation group from east London. Representatives from the county trusts for nature conservation within the Society's Area attended meetings as did the Assistant Regional Officer from the Nature Conservancy Council.

A major issue during 1977 was the matter of tree felling in many of London's parks. This problem has now reached major proportions as a result of the wave of Dutch elm disease which has left so many dead trees in the area. The attitude of the park keepers is to clear all the dead elms. Many elms do have to be felled as they form a serious danger to members of the public. However, the committee would like to see the trunks, properly treated when necessary, remain in areas where they do not constitute a hazard. They would provide a valuable habitat for many different species of animal life. The committee has tried on a number of occasions to persuade park superintendents to leave dead elms, but efforts have often resulted in little success. Those responsible for local parks regard any treatment of dead trees as unnecessary and expensive, so large scale felling has continued. Of all the parks affected in this way, Wanstead Park in east London has caused greatest concern. The committee asked the conservators of Epping Forest, who are responsible for the park, to leave a number of dead elms, but many were felled during the nesting season. Large areas of woodland, in this park, containing specimens of living, healthy trees, have been felled. The committee now proposes to take the matter to a higher authority in an attempt to halt this vandalism.

Hampstead Heath was again one of the main items on the agenda of committee meetings. The major cause for concern was the deterioration in the condition of the iron railings and wooden fencing around Kenwood. Large gaps in the fences allowed vandals to enter and cause damage in the woodlands which are classified as a Site of Special Scientific Interest. Letters were sent to the Greater London Council's Parks Department asking if repairs could be carried out. Their reply stated that money was not available, especially to replace the iron railings which would cost £20 per yard. In times of financial restraint, it is often difficult to persuade local authorities to undertake work of this kind.

A total of forty-five sites was dealt with during the year. The committee is always pleased to hear from members of the Society. Following a complaint from a member, representations were made to the British Waterways Board about spraying vegetation along the banks of the Grand Union Canal. The committee was also pleased to advise the superintendent of Mortlake Crematorium on the planting of species to encourage the presence of wildlife.

The problem of dealing with threats in London is not dealt with by the London Nature Conservation Committee alone. Within the Society's Area, there is a large number of other natural history societies and conservation

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groups. It is the committee's policy to co-operate and provide support when possible. The committee, together with a number of other organisations, supported the proposals from the Sutton Branch of the Friends of the Earth to protect the future of Beddington Sewage Farm in the face of official plans for development.

Problems of the conservation of important geological sites were dealt with. An attempt was made to discover any LNHS member who might remember the pipe formations in Knockmill chalkpit in Kent. These interesting formations can no longer be seen as they lie buried under metres of rubbish dumped illicitly in the pit. Kent County Council is considering the possibility of landscaping the site while allowing for the conservation of geological interest. The committee's geological representative has continued with the search for clues and, hopefully, the mystery will eventually be solved.

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## Book Review

*A Nature Conservation Review*. Edited by Derek [A.] Ratcliffe. 1: xvi + 401 pp. + 9 plates + 9 maps. 2: viii + 320 pp. Cambridge University Press, Cambridge. 1977. 1: £35.00; 2: £25.00.

This two volume work has been produced by the Nature Conservancy Council and the Natural Environment Research Council. It reports on the results of the 1965 review of sites important to nature conservation. These sites must be safeguarded urgently within the provisions of nature conservation in Britain.

Vol. 1 summarizes the methods and results of the site assessment and selection. The sites were graded into a series of four depending on their importance. Grade 1 includes sites of international and national importance, many of which are already national nature reserves. Grade 4 sites are classified as Sites of Special Scientific Importance.

The remainder of Vol. 1 consists of a number of chapters describing the flora and fauna of seven British ecosystems: coastlands; woodlands; lowland grasslands, heaths and scrub; open waters; peatlands; upland grasslands and heaths; and artificial habitats. The latter are those habitats created and maintained by human activity which have a considerable wildlife and nature conservation interest. 24% of British plant species are wholly or mainly dependent on man-made habitats. The problems of the conservation of flora and fauna are considered in additional chapters. An appendix updates some of the information and there are maps showing the distribution of the key sites of different habitats.

Vol. 2 gives a detailed account of important environmental and biological features of the grade 1 and grade 2 sites, chosen to represent examples of the full range of habitats, as well as for the preservation of individual species. It would have been useful to have had all the sites listed, but grades 3 and 4 were probably omitted in order to save space. Key sites occurring in the London Area are Box Hill—Headley Heath and Wormley Wood—Hoddesdon Park Wood, both grade 1.

This is a fascinating work, packed full of information. Vol. 1 is a first-class account of British ecology that would be a useful text for many students. Anyone interested in conservation should have a browse through these volumes as they illustrate the kind of detailed observations that must be collected before any site can be selected for conservation. This work is probably too expensive for many private libraries but a copy is available in the society's library at Imperial College.



## Botanical Records for 1977

by R. M. BURTON\*

### Summary

A selection is given of the more interesting records of vascular plants seen in 1977 within 32 km (20 miles) of St Paul's Cathedral, London. *Bidens connata* Muhl. is new to Britain. Plants new to the London Area include *Oryzopsis miliacea* and *Veronica peregrina*. New vice-county records include *Galium mollugo* x *verum* and *Hieracium umbellatum* in Hertfordshire, and *Linaria* x *sepium* and *Rorippa austriaca* x *sylvestris* in Middlesex. Several species were found in places where they had been seen in the last century and not since; this is related to the weather in the preceding winter.

### Introduction

The principal climatic influence on our 1977 plant records was the very high rainfall of the last quarter of 1976 which followed the famous drought, and was in turn followed by continuing cool and often wet weather for much of the year. Many autumn and winter germinating species appeared in exceptional abundance, including annual and biennial species of *Cerastium*, *Echium*, *Erophila*, *Geranium*, *Lathyrus*, *Papaver*, *Trifolium* and *Verbascum*; the large quantities of *Cardamine hirsuta* appearing as a garden weed in spring were reported in the national press. Cool spring-like weather in the middle of the summer stimulated a second, autumnal flowering of such vernal species as *Moehringia trinervia* seen on our meeting of 18 September.

Names of species in the following paragraphs without any indication of the authors of the names are those used by Dandy (1958). All the localities mentioned are placed in a tetrad, e.g. (35T62); this method of dividing the Society's Area is explained by Sandford (1972).

### Records

#### V.C. 16, West Kent

Numerous plants of *Trifolium ornithopodioides* were found at our meeting of 3 July in lawns near Lesnes Abbey (47T68). Earlier in the year I saw abundant *Stellaria pallida* and *Cerastium semidecandrum* in the same area. It is a long time since any of these species has been reported in Kent by our members, except at Dartford Heath, yet I also saw all three in other places in 1977: the *Trifolium* in Avery Hill Park (47T44), the *Cerastium* in Avery Hill Park, on Blackheath (47T06) abundantly, and near Lullingstone Castle (56T24), and the *Stellaria* in the Darent valley above Horton Kirby (56T46). The meeting also visited an area near Crossness Sewage Works (48T80), and the Twin Tumps area of Thamesmead (48T40 and T60) (Burton 1977: 85–86). In the former locality abundant *Torilis nodosa* and *Geranium rotundifolium* were among the numerous plants seen, and by a ditch was *Puccinella distans* as a form with strongly red-tinged lemmas. The moats of the Twin Tumps, which a year before had had *Ranunculus trichophyllus* and *R. circinatus* among the dense aquatic vegetation, had neither in July 1977, but there was a strong plant of *R. baudotii*. A *Verbascum* with no flowers fully expanded, just out of the nature trail area and almost out of reach across a fence, proved, on examination of those fragments which could be collected, to be *V. x thapsi*.

In the following month I visited this site with B. Wurzell; *Ranunculus baudotii* had by then disappeared, and the *Verbascum* had been destroyed by the collapse

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of the fence, but in recompense we were able to get beyond and found *V. lychnitis*, the rarer of its parents, and *Bunias orientalis*. Mr Wurzell and I also succeeded in gaining entry to other places nearby, which are now almost inaccessible. Further west, brick blast tunnels and foundations of large buildings remain as relics of Woolwich Arsenal (48T40); amongst these we found *Carex spicata*, *Centaurea scabiosa*, *Epilobium adenocaulon* x *tetragonum*, *E. hirsutum* x *tetragonum*, *Erigeron acer*, *Inula conyza*, *Lotus tenuis*, *Potamogeton berchtoldii*, *P. pusillus*, *Sagina apetala*, *S. ciliata*, *Salix caprea* x *viminialis*, *Samolus valerandi* abundant in a ditch, its second locality in this area, *Senecio* x *londinensis* and *Typha angustifolia*. The species in this list commonly regarded as calcicolous were at the decaying edge of concrete foundations, and are mostly wind-dispersed. North of Thamesmead by the river, flood prevention works have created an open gravelly area (48T60) below high-water mark, with a ditch which has been colonised by *Aster tripolium*, *Scirpus maritimus*, *Spergularia media*, *Triglochin maritima* and *Phragmites*, stolons of which, several metres in length, were spreading across both the water and the gravel. Between the ditch and the river-wall were large populations of *Geranium rotundifolium* and *Melilotus indica* and assorted willow-herbs, including *Epilobium adenocaulon* x *hirsutum*, *E. adenocaulon* x *parviflorum* and *E. obscurum*. We also found *Atropa belladonna* at the edge of this area on a bank near the contractor's site hut, and *Elodea nuttallii* with more *Potamogeton pusillus* in a new river draining Thamesmead.

The chalk-pit at Stone (57T64), now being filled with refuse, was again examined on our excursion of 16 October. In 1976 (Burton 1977: 85) this had produced numerous exotic species associated with waste from a local oil-milling works, but no fresh accretions of this material had been dumped there in 1977 and plants introduced in this way had presumably either regenerated or overwintered, as in the case of *Sicyos angulatus* L. which was fruiting freely. The only *Amaranthus* seen was *A. caudatus* L. Other aliens present were three unusual garden plants, *Arctotis breviscapa* Thunb., *Coreopsis tinctoria* Nutt. and *Verbena rigida* Sprengel, and a Mediterranean grass *Oryzopsis miliacea* which is likely to have been introduced in birdseed. Earlier in 1977 J. R. Palmer found *Cerastium arvense*, *Festuca longifolia* and *Verbascum lychnitis* in chalk grassland at the top of this pit.

On 16 October Mr Palmer took us to a site at Horns Cross (57T64) which used to be a rubbish tip but is now covered with gravelly soil, presumably imported, and showed us the only plant of *Apera spica-venti* seen in Kent in recent years. Earlier in the year he had seen *Silene coeli-rosa* (L.) Godron and *Vulpia ciliata* there, but in October only *V. myuros* could be detected. The nodding stems which make up the tufts of this grass had been beaten down to the ground by rain a few weeks earlier, and already the seeds had germinated densely in radiating rows. Another grass which attracted some attention was *Agrostis stolonifera* x *tenuis*; the identification of this plant, isolated on the gravel, was not arrived at easily, and, when it grows among other grasses where its intermediate habit is obscured, it is surely constantly overlooked.

Finally, we were taken to a bank (57T42) by a motorway slip-road east of Dartford where there were large quantities of *Vicia pannonica* Crantz, discovered earlier in the year by G. S. Joyce, growing with *Lathyrus aphaca*. Clement (1977: 18) has pointed out that all reported British occurrences of the alien *Vicia* have had the *Lathyrus* for company, and made the inference that seeds of both occur together in mixtures imported for sowing on new roadside banks on chalky soils, where the grasses usually sown would not thrive.



We owe several other interesting records to Dr Joyce. *Barbarea intermedia* was by the River Darent (56T46) near Farningham; this occurrence may be connected with the recent construction of a stretch of motorway bridging the river nearby. He found *Saxifraga tridactylites* on Eynsford Castle (56T44) from which it was absent ten years ago. Near Farningham Wood (56T46) he collected *Symphytum caucasicum* Bieb.; this is the commonest red/blue-flowered comfrey in gardens, but rarely escapes.

Mr Palmer submitted a long and interesting list as usual. He reports *Valerianella carinata* from Beacon Woods, Bean (57T80), and walls at South Darenth (56T68) where *Legousia hybrida* was a garden weed. *Petroselinum segetum* was so frequent on roadsides in his part of Kent (mostly 57) in 1977 that localities are not worth listing, and that is also my experience further south in 56, and just into 55 at Otford (55T28). On the gravelly roadside grassland of Green Street Green and Lane End (mostly 57T60) he found *Koeleria cristata*, *Trifolium glomeratum*, *T. striatum* and *T. subterraneum*; some of these clovers have been repeatedly and vainly searched for there since Dr Rose found them in 1945, and *T. suffocatum* still awaits rediscovery. Nearby on waste ground were three plants of *Eruca sativa*; this crucifer used to be grown in Mediterranean countries for its oily seeds, but in the absence of other aliens one cannot infer how it reached Lane End. Mr Palmer found a large colony of *Bromus diandrus* at Greenhithe (57T64 and T84). Our few recent records of *Carex divisa* are all from the neighbourhood of the river-wall near the Thames in Kent; Mr Palmer found it on higher ground near the electricity board's sub-station at Springhead (67T02). This is a native plant which has been overlooked there before; but what is one to make of the status of *Vicia lutea* which he found on waste ground between allotments at South Darenth (56T68)? About a dozen plants were growing in a dense population of the common form of *V. sativa*. Both of these records have been confirmed by E. G. Philp. Near the old A2 road (57T82) Mr Palmer found a mixed population of *Tragopogon pratensis*; as well as the common native subsp. *minor* and the occasional alien subsp. *pratensis*, there was also a plant with the florets half as long as the whitish-bordered phyllaries, assumed to be a hybrid. Further west on broken chalky ground north of this road (57T62) at the edge of a large chalk-pit were several large plants of *Ajuga chamaepitys*. In a copse at Springhead (67T02) he found *Vicia bithynica* in much greater abundance than in its two other known stations in West Kent, with *Ophrys apifera*. By the A2 further west (67T02) *Hordeum leporinum* Link was in several places. On Dartford Marshes (57T46) he reports the continued occurrence of *Hydrocharis morsus-ranae*, which had been feared lost there, and on the river-wall (57T26) *Hordeum marinum*, in about the same place where it was last seen in our area by Mr & Mrs P. C. Hall in 1955 (Kent & Lousley 1957 : 323). West of Fawkham church (56T88) a chalky field provided *Papaver argemone*, *P. hybridum*, *P. lecoqii* and *Potentilla recta*. *Papaver hybridum* appeared in many fields in this part of Kent (also 56T86 and 66T06) in 1977, often in some abundance, and *Potentilla recta* was also found by Mr Palmer near Swanscombe Wood (57T82 and 67T02). Also near Fawkham (56T88) he found *Monotropa hypophegea* and *Genista tinctoria*. The Swanscombe skull site is his unexpected locality for *Silybum marianum* and *Kniphofia uvaria* (L.) Hook; nearby was an extensive colony of *Carex disticha*. A pool in the Darenth valley below South Darenth (57T60) supplied him with *Potamogeton crispus* and *Lagarosiphon major*; this may be the same water in which I found not these, but *Callitriche obtusangula*, *C. platycarpa*, *Potamogeton berchtoldii* and *Ranunculus circinatus*. *Lagarosiphon* was also in a lake near Cobham Terrace (57T84) which Mr Palmer inspected, with *Ranunculus baudotii*.

I have already mentioned Blackheath. On a later visit I found *Erodium cicutarium*, *Festuca tenuifolia*, *Koeleria cristata*, *Sagina ciliata* and two plants of



*Trifolium striatum*. I cannot locate an earlier record of the clover on Blackheath this century, and for the *Koeleria* it seems necessary to go back to the time of Daniel Cooper (1837) who listed it as *Airochloa cristata*. It was not mentioned by Mill (1857) who did, however, see *Trifolium striatum* in 1856 about 50 or 100 m from my plants "very abundantly along the road crossing the heath diagonally towards Morden College, and the prolongation of that road into Blackheath Park" and also *Tragopogon porrifolius* "in some abundance in a corner of a meadow by the prolongation (already mentioned) of the diagonal road in Blackheath Park . . . completely established . . . for some years past". This latter spot must be very near where Miss M. P. Brown saw numerous plants of the same species in 1977. She mentioned derelict wartime allotments in the area as a likely source, but I cannot imagine that salsify was grown there.

The Orpington botanists have also again had a rewarding year. On Sundridge Park golf course (47T00) Mrs J. Pitt, Mrs S. Pittman and Mrs J. Weightman found *Carex pilulifera*, *Lemma polyrhiza*, a large colony of *Potentilla recta*, *Senecio sylvaticus* and *Verbascum lychnitis*. In the pond in Darrick Wood (46T44), which was cleaned in 1976, Mrs Pitt found *Bideus cernua*, *Glyceria declinata* and *Ranunculus aquatilis*. She saw a single tree of *Tilia cordata* in Farningham Wood (56T28), which might be the one seen by R. A. Boniface in 1950 (Lousley 1951), and yet another due west in a hedge near Swanley Station (56T08). Gumping Common (46T46) produced *Cardamine amara*, *Lysimachia vulgaris* and a single small plant of *Helleborus viridis* of mysterious origin. The ladies' best 1977 record is *Silene gallica* found in quantity by a road on Hayes Common (46T04); it is a rare event when we get such a convincing record. On a scrubby chalk slope near Westerham (45T46) the most unusual plants they found were *Cynoglossum officinale* and *Hyoscyamus niger*.

Chalky ground further east (45T86) gave R. Clarke *Cuscuta epithymum* and a second dodder species with yellowish stems, probably *C. campestris* Yuncker. The condition of the material is not quite good enough to allow certain determination, but the plant must be alien and its source is a mystery. No clue is given by the presence of *Lamium hybridum* nearby; this species turned up all over the London Area in 1977.

## V.C. 17, Surrey

Mr Clarke found about 20 plants of *Verbascum lychnitis* near Nore Hill (35T66); he also found one at Oxted lime-works (35T84), where there was also a single *Papaver lecoqii*; near Whyteleafe (35T28) there were several plants of the *Papaver*, along with four *V. lychnitis* x *thapsus*, and *Acinos arvensis*, *Anthyllis vulneraria* and *Odontites verna* subsp. *verna*; he has passed on to me E. C. Wallace's record of the white mullein from the Happy Valley, Coulsdon (35T06). Near Purley Downs (36T20) Mr Clarke was able to get into ground not usually accessible, so increasing the known area of *Phyteuma tenerum* here, and discovering in derelict gardens *Lythrum junceum* Banks & Sol. and *Epilobium lanceolatum*, identified by myself and Mr Wallace respectively. A field next to Mitchley Wood, Sanderstead (36T20), provided a fine assortment of arable weeds including *Avena ludoviciana*, *Fumaria micrantha*, *Kickxia elatine*, *K. spuria* and the declining *Valerianella dentata*. Later in the year Mr Clarke discovered *Hirschfeldia incana* in Butterfly Walk (35T46) near Warlingham, which he suggests was introduced by horses, and *Crepis biennis* on Tippetts Piece (35T46), which came up after disturbance and was last found in this neighbourhood in 1923 by A. Beadell. But Mr Clarke's best record for 1977 is *Mimuartia hybrida* which was growing close to a place where it was found about a century before by Arthur Bennett (Salmon 1931, as *Arenaria tenuifolia*) on barish chalky ground. *Cerastium semidecandrum* shared the habitat, and in the same neighbourhood (35T28) Mr Clarke found *Lotus tenuis*, *Orobancha elatior* and *Trifolium striatum*.

*Cerastium semidecandrum* turned up unexpectedly on the chalk of Epsom Downs (25T28) during B. R. Radcliffe's excursion of 26 June, on a footpath near the golf course. We were shown the unusual calcicolous plants of Epsom and Walton Downs (25T06, T26 and T28) which make this such a valuable area botanically, and also seedlings of *Juglans regia*, *Quercus ilex* and *Tilia x europaea*, a patch of *Bromus carinatus*, *Duchesnea indica* persisting feebly where tipped out in garden rubbish, and *Rosa micrantha*. This was growing with another since named by Dr R. Melville as *R. dumetorum*, close to var. *hemitricha* (Rip.) W.-Dod. Not seen were *Lathyrus nissolia*, which Mr Radcliffe found abundantly in a field (25T26), and the single plant of *Salvia pratensis* found in rough grassland by K. Page (25T28).

The flora of Bookham Common is again receiving attention and several plants have been found which were not known to Jones (1954). The more unusual species seen in 1977 include *Cephalanthera damasonium*, a rare orchid off the chalk, of which Mr Radcliffe found a single plant in the southern part of the common; *Doronicum pardalianches* found by Dr A. S. Thorley, about 20 m from the foregoing; *Luzula forsteri* at the edge of the common by the railway (all 15T24); *Carex strigosa* near Kelsey's Pond, known to Mr Page for several years; two plants of *Dactylorhiza maculata* subsp. *ericetorum*, found by Mr Radcliffe on Eastern Plain; *Euphorbia robbiae* Turrill escaped from a garden and was established by a footpath, found and named by Mr Page; *Geranium lucidum*, which may have been accidentally introduced in the mud on Mr Radcliffe's boots, as it is a weed in his garden; and *Ranunculus trichophyllus* at the edge of Lower Eastern Pond (all 15T26). This was found by Mrs J. E. Smith in 1977, and in the same pond by E. B. Bishop in 1925; D. H. Kent's 1935 gathering was from a ditch which may have been in a different part of the common (Kent & Lousley 1951: 3).

Other valuable records made by Mr Radcliffe in 1977 include *Bromus inermis* and *B. unioloides* on roadsides at Long Ditton (16T66), *Conopodium majus* in the lawn around Kingston Library (16T88), seedlings of *Cotoneaster franchetii* Bois at Tattenham Corner (25T28), *Polygonum amplexicaule*, *P. cuspidatum*, *P. polystachyum* and *P. sachalinense* close together on a railway bank at Long Ditton (16T66), and *Verbascum lychnitis* on the footpath nearby. His own comment is that in this area the plant must be a "casual", and light seeds, like those of mulleins, can be carried long distances in the air behind fast trains, but where could this have come from? Mr Radcliffe was also the first to tell me of the remarkable abundance of *Apera spica-venti* along at least 10 km of a new stretch of A3 road, from Ockham Common (05T88) to the Ace of Spades (16T84).

Many of the 1977 outings of Mrs L. M. P. Small and her friends, the "Small field club", were in Surrey. The Epsom pond (25T08), where in 1976 they discovered *Crassula helmsii* (T. Kirk) Cockayne, had much more water in it, with *Ranunculus trichophyllus*. Nearby was *Epilobium lanceolatum*. On Walton Downs (25T06) they found *Papaver argemone*. *Rumex pulcher* persists on Barnes Common (27T24) although *Rosa spinosissima* may have been destroyed by fire in 1976. Two plants of *Erucastrum gallicum* (Willd.) O. E. Schulz in the same chalkpit at Coulsdon (35T08) where Mr Wurzell found it in 1973 (Lousley 1974: 83) show that this plant can persist here; *Geranium rotundifolium* was also present.

For the first time in years we have some interesting records from the Surrey part of Inner London. D. Boyd and P. J. Strangeman independently reported a group of five plants of *Atropa belladonna* in St Thomas' Street, Southwark; I think this is just in 38T20, but an unexplained dot on the map in the *Flora of*



Surrey (Lousley 1976) in the tetrad to the south most probably refers to a sighting of the same colony by D. P. Young. The plants are within the boundaries of Guy's Hospital and might once have been cultivated for the hospital pharmacy. Also in Southwark, 1977 saw the inception of the William Curtis Ecological Park (38T20). A long list of plants has been made from this small area by J. Cotton, but many of them have been introduced accidentally or deliberately in the process of diversifying the habitat. However, Mr Cotton insists that the occurrence of *Vicia cracca* and the single large *Geranium rotundifolium* cannot be explained by this activity.

In the garden of the South London Botanical Institute (37T02) 27 species came up in top-soil supplied by a contractor, including *Brassica oleracea*, abundant *Galeopsis speciosa*, *G. tetrahit*, *Geranium lucidum* and tomato *Lycopersicum esculentum* Miller. It is amusing to speculate on the source of this material. I also wonder how *Veronica peregrina*, a new plant for our area, got into the flower-beds at Grange Park, Carshalton (26T84); a living specimen of this was shown to me by H. W. Phillips. Dr Meikle found plenty of *Trifolium glomeratum* on Kew Green (17T86), where it was last seen in 1920 (Salmon 1931). It is regrettable that older stations of this species were not included in the recent *Flora of Surrey* (Lousley 1976); I will repair the deficiency by suggesting that the species should be searched for on Addington Hills, where it might be expected to reappear.

Miss M. B. J. Clark's records include a colony of *Fumaria vaillantii* at Woldingham (35T46), *Epilobium roseum* in Gatton Park (25T62), *Bunias orientalis* in Rye Wood, Oxted (35T62), no doubt introduced by motorway works which have bisected this wood, and abundant *Lathyrus nissolia* by a Purley playing field (26T80). Miss P. Bartlett sent me evidence that *Nardus stricta* can still be found on Mitcham Common (26T86). Mrs E. Norman told me of *Lychnis coronaria* (L.) Desr. and *Sedum spurium* by a disused reservoir at Barnes (27T06), and *Phytolacca acinosa* Roxb. (the plant wrongly called *P. americana* in British floras) which turned up in a garden in East Molesey (on the boundary of 16T46 and T48). Many other members must also have seen from trains the surprising group of *Echium vulgare* which I noticed between Peckham Rye and Denmark Hill stations (37T26); I am sure it did not flower there in previous years.

A plant collected by J. E. Lousley at Hurst Park (16T28 or T48) in 1963 as *Oenothera parviflora* (Lousley 1964 : 21) has been re-determined by Dr Rostanski as *O. perangusta* Gates. Lousley then said that *O. parviflora* might be increasing in our area, but it now seems likely that all the records he mentioned are doubtful. Any evening primrose which is not obviously the common *O. erythrosepala*, which has very large petals, red-tinged sepals and small red spots on the stem, is worth collecting.

## V.C. 18, South Essex

Our meeting of 10 July visited Walthamstow Reservoirs (mostly 38T48), under Mr Wurzell's tutelage. The plants seen included *Bunias orientalis*, *Carduus nutans*, one *Carex vesicaria*, *Hieracium maculatum*, *Lepidium campestre*, *Rumex crispus* x *cristatus*, *Senecio sylvaticus* on old cinders, and *Sherardia arvensis*. *Galium erectum* is locally abundant here and much more distinctive in appearance than the downland plants too often recorded under the same name. Members who attended the 1973 meeting at the same locality and recollect seeing J. E. Lousley identify a much damaged *Rumex* hybrid as *R. cristatus* x *obtusifolius* may have been puzzled by the recent publication of this hybrid as *R. x lousleyi* (Kent 1977) based on a specimen collected by him on the same day, nearby in



Middlesex (Lousley 1974 : 84). There were in fact two plants, both of which had been noticed previously by Mr Wurzell: the Essex one soon disappeared, but the Middlesex plant lives on. Another of Mr Wurzell's finds is *Oenanthe fistulosa* in about 100 m of dried ditch on Walthamstow Marshes (38T46).

On 7 August we visited South Weald Park (59T64). The principal discovery was *Potentilla anglica* in a rabbit-grazed area near the north boundary, but other species already known from there attracted much interest. *Galium uliginosum* was found in two places. *Blechnum spicant* and *Thelypteris oreopteris* occur together in a ditch, and Dr K. J. Adams, who led the meeting, pointed out that this was by a former main driveway. However, the presence of *Equisetum sylvaticum* nearby, a species which I doubt was available in commerce even at the height of the "fern craze", suggests that all three may be indigenous species protected from the depredations of enthusiasts by their situation in the middle of an enclosed park.

In the car-park at Brentwood Station (59T82) an unexpected colony of *Rumex patientia* was observed; some of the plants had more strongly toothed fruiting sepals than published descriptions allow. On the way there I discovered a large isolated population of *R. pulcher* on a roadside (67T08) north of Grays.

The other large country park near Brentwood, Thorndon Park, was visited by our meeting of 13 August. Until recently the Society received very few records from here, and it may be that members were not aware that its area extended thus far; in fact the lake in Mill Wood (68T28), the most unusual plants of which are *Alisma lanceolatum* and *Carex pseudocyperus*, is exactly 20 miles from St Paul's Cathedral. To the south and north-west (69T20) of the lake, R. M. Payne led us to scattered plants of *Polystichum aculeatum* near small streams; the highest and densest population of this fern is on what was once an ornamental bridge, but which is now a crumbling piece of masonry hidden in secondary woodland, suggesting that it was originally planted. This casts doubt on the status of *Blechnum spicant* and *Thelypteris oreopteris* in a ditch in a different part of the park (69T00), and re-opens the question of these two ferns in South Weald Park mentioned earlier. To get from one extremity of Thorndon Park to the other, Mr Payne took us past Childerditch Pond (69T00), well known for its marginal *Hydrocotyle*. Part of this pond has recently been cleaned, making it possible for *Oenanthe aquatica* to grow and be seen in the middle. The Upper Pond nearby has *O. fistulosa* and *Achillea ptarmica* at its fringe.

J. H. Davidson told me of about 20 plants of *Silybum marianum* by a footpath (68T00) near Stifford. The refuse tip (48T62) near Barking, which for many years produced abundant alien plants, has now closed, but in 1977 he found *Anthemis tinctoria* and *Lagurus ovatus* there. D. H. Kent found *Melilotus indica* by the gas-holder station at Romford Road, Manor Park (48T24 or T26) and *Rumex pulcher* and *Trifolium arvense* at Bromley-by-Bow Gasworks (38T82). The *Rumex* was seen by Mr Davidson on the river-bank nearby in 1971, but the two occurrences are unconnected, as Mr Kent says that his plants were introduced with turf.

## V.C. 20, Herts.

Two plants new to this county have been discovered in the course of our 1977 excursions. On 20 August on Croxley Moor (09T64) *Galium mollugo* x *verum* was with its parents among *Genista anglica* and other plants of this interesting habitat. The moor had been approached by way of a bridge (09T84) over the Grand Union Canal near which were *Geranium pusillum*, *Lepidium latifolium*, *Orobanchë minor* and *Verbena officinalis*. About 700 m from the bridge on the

canal towpath (09T64) was a single plant of either *Bidens frondosa* or a close ally; this was searched for later in the year but had disappeared before it was mature enough for certain identification.

Later that day P. H. Hazle showed us *Melissa officinalis* and a large tree of *Alnus glutinosa* var. *laciniata* Willd. by the same canal in Cassiobury Park (09T86). This is surely the tree from which A. B. Jackson took a specimen in 1911 (Dony 1967 : 81). I would guess that it was planted when the canal was dug. After the meeting I found a large colony of *Calamagrostis epigejos* in Lees Wood (09T68) and a single plant of *Silybum marianum* in a long derelict garden (09T86) north-west of Watford.

Our other new county record is *Hieracium umbellatum*, found on 18 September south of Brookmans Park Station (20T42), close to plants of *H. perpropinquum* and *H. vagum*. Only the last of these three had been reported here, but as all are of similar habit it is possible that *H. umbellatum* had been overlooked. It is easily distinguished from other late-flowering leafy hawk-weeds by the spreading tips of its involucre bracts. The same railway bank was rewarding in other ways: further south H. J. Killick showed us *Medicago falcata* flourishing where he has known it for some years, with *Sedum telephium*, and *Lepidium canpestre* turned up nearby.

Earlier Mr Killick had taken us to Gobions Park (20T42) where *Ulmus carpinifolia* and *Viola odorata* were obviously planted initially, and *Prunus lusitanica* appears to spread by seed. The main interest here is in the lake; this had recently been cleaned, and *Rorippa amphibia* had come up in thousands on the dredged mud. Other plants seen here include *Bidens cernua* and *Ranunculus trichophyllus*.

Mr Killick has sent many other records of which I can mention only a few. *Echium vulgare* was at a roadside in Cuffley (30T02). One plant of *Lagurus ovatus* on a path nearby was "presumably a bird-seed alien". *Erophila verna* also appeared in this neighbourhood for the first time. Some of his observations refer to earlier years, the best being *Equisetum sylvaticum* in a wood (20T46) west of Pope's Farm. Also from earlier years a plant collected in allotments (19T04) near Watford by J. Rogerson in 1974 has been determined by P. D. Sell as *Fumaria vaillantii*; this species is usually in cornfields on chalk and it is not surprisingly new to our Hertfordshire records. Dr Sell also identified a hawk-weed collected by Mr Rogerson on an abandoned railway (also 19T04) as *H. strumosum*. *Petroselinum segetum* was discovered on a roadside (10T84) near London Colney by A. D. Marshall, who also found *Rumex maritimus* near Mill Green (20T48); both species are sporadic in Hertfordshire. Mr Marshall found *Elodea nuttallii* in the River Gade at King's Langley (00T62), and near Watford (09T88).

## V.C. 21, Middlesex

The Walthamstow Reservoirs area mentioned above under Essex is also partly in Middlesex; the boundary follows the course of the River Lee before it was diverted to make the reservoirs. The large population of *Rorippa austriaca* x *sylvestris* reported two years ago (Burton 1976 : 46) was found to lie across this line, and *Crepis biennis* was also seen in both counties on 10 July, whereas *Festuca longifolia* and *Poa angustifolia* were in Middlesex only. On the way I saw several plants of *Coriandrum sativum* in Ferry Lane (38T48), and Mr Wurzell also has seen some unexpected plants in Tottenham. One building site (38T48) supported *Hieracium perpropinquum*, *Hypericum perforatum*,



*Lamium hybridum*, *Medicago arabica*, *Scleranthus annuus* and rayed *Senecio vulgaris*; another in St Ann's Road (38T28) had one plant of *Geranium rotundifolium*, a rare plant in Middlesex.

In disused marshalling yards at Feltham (17T02 and T22) P. J. Cribb discovered a hybrid new to Middlesex, *Linaria* x *sepium*, with assorted back-crosses to its parents *L. repens* and *L. vulgaris*. Many members have reported the assortment of plants shown by Dr Cribb both in this fine example of a derelict railway property, and in the River Crane which passes underneath, which has *Potamogeton crispus*, *P. pectinatus* and *P. pusillus*.

From a new county record I pass to a new national one. In September Mrs M. V. Marsden sent me a piece of *Bidens* which was too small to be identifiable, but attracted interest because the awns crowning the fruits had hairs pointing forwards; our native bur-marigolds have awns with slightly hooked bristles which point backwards, so that the fruit readily becomes attached to passing socks and trouser-legs. I persuaded Mrs Marsden to collect more material, which was growing by the Grand Union Canal (18T22) near Greenford. It is *B. connata* Muhl., an American species which has been naturalised in Europe for over a century and is still spreading in France (Debray 1963). Nearly all the continental localities are by navigable waterways, and it is assumed that it is spread by boat traffic. The plant is likely to have occurred elsewhere and been overlooked, as it is similar to our native species in general appearance. As the most clear-cut distinctions are in the achenes, it is best searched for in the autumn. The achenes are narrowly rhombic in section, with a strong rib marking each angle; the faces between the ribs are warty (warts are lacking in *B. cernua* which can also have four ribs, whilst *B. tripartita* has only two ribbed angles). The character which first caught my attention is inconstant, but has been observed on many of the recent French specimens; it is the basis of var. *anomala* Sherff, but there are also named varieties with distinctive leaf-shapes and this one would be better reduced to a form. In Mrs Marsden's plant, again as in many of the French ones, the larger leaves have an obvious winged petiole, and are unlobed, with irregular forward-pointing teeth.

Mrs Marsden has communicated many other discoveries. She and J. R. Phillips found *Calamintha ascendens*, which had been feared extinct in Middlesex (Kent 1975 : 428), near Harefield (09T40), where it was last seen in the county, with abundant *Atropa belladonna* and *Inula conyza*. Stanmore Common (19T42, T44 and T62) has also been rewarding: they found *Menyanthes trifoliata*, *Ranunculus trichophyllus*, *Scirpus fluitans*, *Stratiotes aloides* and *Utricularia vulgaris* in various ponds, and, when investigating a possible hybrid (*Symphlytum* x *uplandicum*) among a well-known colony of *S. tuberosum*, found *Polygonum bistorta*.

A different part of the Grand Union Canal was examined by Miss R. M. Hadden. North of Harefield Moor (08T48) she found *Sagittaria sagittifolia*. This has not been reported there recently, but we have an 1898 record by C. S. Nicholson. Further north (09T40) she found *Alisma lanceolatum* and *Atropa belladonna*. D. H. Kent's Middlesex records include *Bromus carinatus*, which was in a hedgebank between Ashford and Feltham Hill (07T80), and abundant *Viola tricolor* in a small area of gravelly waste ground (08T42) between Uxbridge and Cowley. It is agreeable to have a reliable record of the true wild pansy; too often reverting seedlings of garden pansies of hybrid origin are reported under its name.

Mrs S. Wenham sent me a list of discoveries from south-west Middlesex. Her best find was *Polygonum mite* on Priory Green (07T40). On Staines Moor



(07T22) she saw *Groenlandia densa*, *Moenchia erecta*, *Primula veris*, *Ranunculus trichophyllus* and *Scirpus setaceus*. Earlier in the year R. A. Boniface had found abundant *Montia fontana* and *Stellaria pallida* in the same area; a proposal to dig gravel here was scotched by the objections of this Society and other bodies at a planning enquiry the year before. Mrs Wenham also found *Groenlandia* with *Elodea nuttallii* at Shepperton, and *Ranunculus trichophyllus* in Shortwood Common Pond (07T40). At Sunbury (16T08), near the Thames she got *Asplenium adiantum-nigrum*, *Montia fontana*, *Myosotis ramosissima*, *Plantago media* also seen at Ashford (07T80), *Spergularia rubra*, and other unexpected plants.

The remaining Middlesex records that should be mentioned are all in or near Inner London. J. M. Mullin showed a good patch of *Chenopodium murale* in Peel Street, Kensington (28T40), to various people. Dr Joyce sent me a voucher of *Oxalis corniculata* var. *microphylla* Hook. f. (*O. exilis* Cunn.), a garden weed in Lincoln's Inn (38T00). From the Isle of Dogs (37T88) Miss J. M. Stoddart got *Euphorbia uralensis*, and fruiting material of the toothed form of *Rumex patientia* mentioned earlier; without the leaves it is hard to distinguish from *R. cristatus*. A list of plants seen by J. Rogerson near the Grand Union Canal (28T84) at Camden Town includes *Bromus thominii*, *Erodium cicutarium* and *Poa angustifolia*. D. McClintock showed me a specimen from a lawn at Buckingham Palace (27T88) which is a good match for the plant known as *Plantago intermedia* Gilib. I found *Bromus ramosus* at Farringdon Station (38T00), and *Oenanthe crocata* growing out of the woodwork of Tower Pier (38T20).

## V.C. 24, Bucks.

At last we have some records worth publishing from the part of Bucks. in our area. In a gravel-pit at Hythe End (07T02) Mrs Wenham found large quantities of *Hippuris vulgaris* and a *Utricularia*, the latter without flowers and therefore not identifiable. Mr Hazle has given us our first records of *Alisma lanceolatum* and *Impatiens parviflora* for this vice-county and our first of *Solidago virgaurea* since 1940. The water-plantain, in the Grand Union Canal (07T08) west of Langley Station, was previously reported in 1972 (Marcan 1973); the other two were in Gerrards Cross (08T06).

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# A Review of the Macrolepidoptera of the London Area for 1976 and 1977

by C. G. M. DE WORMS\*

## Introduction

This is the ninth biennial review of the macrolepidoptera of the London Area since they started in 1961. The last one, for 1974 and 1975, appeared in *Lond. Nat.* 55 : 48-57 (1976).

A summary of the weather during the two years under review is all important, since it plays such a significant part in controlling the abundance of our Lepidoptera. If 1975 had an outstanding summer, it was far outshone by 1976 with its tropical fortnight starting at the end of June and with shade temperatures soaring to 35°C (95°F) for several days in succession. There was an almost unbroken hot spell to follow in July and throughout most of August. The season was one of the most prolific and precocious this century for our butterflies and moths, with a remarkable record of migrant species. As a contrast, 1977 proved a lean and late season, with a cold spring and only short spells of summer warmth. There were a few migrants, with recognised immigrations in March and October.

Turning to the more outstanding occurrences, 1976 will be remembered for the phenomenal incursion of the Camberwell beauty *Nymphalis antiopa* (L.), of which at least 300 sightings were recorded in Britain extending as far north as Shetland and even reaching Ireland. The London Area can boast of no less than 16 records of some 14 individuals, of which one was seen in the spring of 1977, no doubt after hibernation. As in 1872, when over 400 sightings of this species were recorded in this country, the main invasion came in August and September. There is evidence that its origin was in Scandinavia.

There were several other special records in 1976. The purple emperor *Apatura iris* (L.) was seen in Ashted Woods at the end of June and a white admiral *Ladoga camilla* (L.) in September on Bookham Common, a rare second emergence. The appearance of a high-brown fritillary *Argynnis adippe* (L.) in a garden at Selsdon in July was extraordinary, since it is a woodland insect. The much less prolific season of 1977 produced some unexpected visitors to the Area, notably a large tortoiseshell *Nymphalis polychloros* (L.) feeding on a *Buddleja* in central London and a probable long-tailed blue *Lampides boeticus* (L.) at Surbiton in September. The peacock *Inachis io* (L.) was plentiful with some 40 seen on a *Buddleja* near Warlingham in late August. The painted lady *Cynthia cardui* (L.) was flying sporadically in many parts of the Area in the late summer, while the holly blue *Celastrina argiolus* (L.) appeared plentifully during 1977, even in the City.

Some of the migrant sphingids were among the more outstanding moths which visited the London Area in both years. In 1976 there were several convolvulus hawkmoths *Herse convolvuli* (L.). Two spurge hawks *Hyles euphorbiae* (L.), a great rarity, were recorded: one in the East End in October 1976 and another at Feltham, Middlesex, in August 1977. There were also two bedstraw hawks *Hyles gallii* (Rott.), the first in north-west Surrey in July

\* Three Oaks, Shore's Road, Woking, Surrey.



1976 and another in Essex in August of that year. Among a host of moths in a light-trap at Enfield on 28 June, the hottest night, was an unexpected newcomer, the sand dart *Agrotis ripae* (Hbn.), far from its normal habitat on coastal sand-hills.

Several other species which were new to the London Area in recent years have been spreading steadily. Among these are Blair's pinion *Lithophane leautieri* (Boisd.), first discovered in the Isle of Wight in 1951. Its larva feeds on cypress as also does that of the black streaked pug *Eupithecia phoenicata* (Rambur), first found in Cornwall in 1959, and in 1977 it appeared at Wimbledon. The least carpet *Idaea vulpinaria* (H.-S.) is increasing its range rapidly from north Kent, mainly in Surrey and Essex.

Another noctuid moth new to the Area is the archer's dart *Agrotis vestigialis* (Hufn.), which was first reported from north-west Surrey in 1971.

I would like to accord my thanks to all who have sent in many valuable and interesting records. As before, an asterisk (\*) after the name of a species denotes that it has not been previously noted in the particular vice-county region of the London Area.

## Records

### Inner London

The mercury vapour light-trap was run in the garden of Buckingham Palace for the 19th consecutive season in 1977. As was to be expected, large numbers of moths were recorded during the very hot spell in late June and in early July 1976, but surprisingly little of special note appeared, except four brown-tails *Euproctis chrysorrhaea* (L.) on 1 July, an early date for this species. The wood leopard *Zeuzera pyrina* (L.) was also common. For 1977 perhaps the most interesting visitor was the all-black form *nigra* of the scalloped hazel *Odontopera bidentata* (Clerck) which is gradually spreading through the Area, but had not been seen before in the centre of London. Vine's rustic *Hoplodrina ambigua* (Denis & Schiff.) had a good year in 1977, with its reappearance in the Palace trap.

From the vicinity of the Tower of London Mr Terry Lyle reports seeing during 1976 the small copper *Lycaena phlaeas* (L.) and the holly blue as well as the Essex skipper\* *Thymelicus lineola* (Ochs.), a surprising insect to find so near the centre of the metropolis. So too was a large dark butterfly which he caught sight of feeding on a *Buddleja* in Gordon Square; on closer approach he was able to see it was a large tortoiseshell. The date of 15 September 1977 is of interest, as a few other specimens of this fine insect were also observed about that period, and it may well have been a cross-Channel migrant. Some painted ladies were also seen near the Tower in 1977 by Mr Lyle.

Regent's Park seems to have been the scene of some interesting records during 1976, reported by Mr J. P. Widgery. The most important was a Camberwell beauty observed there by Mr D. C. G. Brown at the end of August. In this month and September of that year there were a good many red admirals *Vanessa atalanta* (L.) with single examples of the comma *Polygonia c-album* (L.) and plenty of small tortoiseshells *Aglais urticae* (L.) in the autumn. A small copper was seen in the park on 9 July, quite a rare visitor to Central London. Moths noted in the park in 1976 included the old lady *Mormo maura* (L.) as late as 27 September, and a red underwing *Catocala nupta* (L.) earlier that month.

On 13 October 1976 Mr T. Smith was walking along Borer's Passage near Devonshire Square in the East End when he spied a large moth well camouflaged at rest on the ground. He at once concluded it was an unusual hawkmoth. Later on referring to the literature, he was able to identify it as a spurge hawk\* *Hyles euphorbiae* (L.), an infrequent visitor to the Area, but a great migrant.

### V.C. 16, West Kent

There appear to be four sightings of Camberwell beauties in West Kent. These were at Middle Wood, Shoreham, on 23 August 1976, with another at Dartford in the first week of September seen twice by Mrs V. Pike. On 7 September one was observed by Mr S. Boucher at Orpington and another in that locality as late as 10 November 1976.

Mr P. J. Strangeman has sent a concise list of observations for both years. In Orpington he noted a freshly-emerged peacock as late as 5 November 1976 which is especially noteworthy, since there is plenty of evidence that there were two broods of this insect, the first in July and another in late September, never previously recorded for the British Isles so far as I am aware. He had already seen this butterfly at Shoreham on 18 July, an early date for the main summer brood. The comma was flying in Pett's Wood on 7 July. He observed the speckled wood *Pararge aegeria* (L.) in this locality on 24 August, and the small copper at Shoreham as late as 25 September, with a red admiral there on the same date. In 1977 the most interesting record by Mr Strangeman was of a clouded yellow *Colias croceus* (Geoff.) seen flying over waste ground at Thamesmead as late as 12 October. This migrant butterfly has become very scarce almost everywhere of late with only a handful of records in 1977. Several commas were also noted at Thamesmead during October 1977 with a number of the wall brown *Pararge megera* (L.) there during August, and red admirals in the autumn.

Mr T. Smith records a number of butterflies noted during 1976 in Ruxley Gravel-pits near Orpington. Among them was the adonis blue *Lysandra bellargus* (Rott.), very local in west Kent, at one of its nearest localities to the metropolis. He also saw this species near Downe, together with some of the chalk form of the silver-studded blue *Plebejus argus* (L.) which has become scarce in this part of Kent. Also near Downe were the small copper, speckled wood and orange-tip.

Mr B. K. West has as usual provided an interesting list of moths caught during the two-year period, mainly from his garden at Bexley. In 1976 he had in his mercury vapour light-trap two examples of the scarce prominent *Odontesia carmelita* (Esp.) with another on a nearby street lamp, both in late April. The little rosy marbled *Elaphria venustula* (Hbn.) was numerous in 1976, though absent in 1977. Webb's wainscot was seen in 1977; this insect seems to be spreading steadily in the Area. The barred rivulet *Perizoma bifaciata* (Haworth) also appeared with the bleached pug *Eupithecia expallidate* Doubleday, both uncommon geometers. Later in 1976 he obtained larvae of this last species on golden-rod in his district. Other larvae of interest found in the Bexley region included the slender pug\* *E. tenuiata* (Hbn.) and the cypress pug from his garden in the autumn of 1976. Those of the milfoil pug\* *E. millefoliata* Rössler, were beaten from yarrow at Bexley and on Dartford Heath, where larvae of the sloe pug\* *Chloroclystis chloerata* (Mab.) were obtained in April 1976.

Other moths seen sparingly by Mr West in both years were the obscure wainscot, the suspected *Parastichtis suspecta* (Hbn.), the double-lobed, the



olive kidney, the beautiful hook-tip *Laspeyria flexula* (Denis & Schiff.), the waved black *Parascotia fuliginaria* (L.), the peacock moth and the lilac beauty *Apeira syringaria* (L.).

As in previous years figures were kept for the proportion of the melanic form *carbonaria* of the peppered moth *Biston betularia* (L.). This again worked out at almost 80%, whereas that of the intermediate form *insularia* was 11% in 1976 and only 4% in 1977. Of interest too was the occurrence of the melanic form *lugubris* of the knotgrass *Acronycta rumicis* (L.) which was 22.5% in 1976 and 16.5% in 1977 out of a total of 60 specimens of this species in each year. This is quite significant, showing the incidence of melanism in this particular region.

## V.C. 17, Surrey

The Camberwell beauty *Nymphalis antiopa* was seen by Mrs Adrien Naylor at Richmond on a lawn on 23 August and near Kew on the next day, the 24th. One was observed on Banstead Heath at the end of August by Mr F. Banyard, one at Dulwich on 27 August, and a further sighting and capture of a specimen on 3 September by Mr Sean Clancy. In 1977 one was caught in a car park by the River Mole at Leatherhead on 22 May by Mr D. C. Davies; this must have been a hibernated insect from the previous year.

On 29 September 1977 Mr R. E. Smith, while cutting grass in a Surbiton cemetery, saw a blue butterfly with a chequered underside and black spot near the base of the wings. From his description and date there can be little doubt it was the long-tailed blue, an infrequent visitor to our shores and above all to the Area. In this cemetery during 1976 Mr Smith reports seeing no less than 40 common blues during July and August, 15 small coppers, four painted ladies, numerous red admirals, several commas and a large number of peacocks, with a hundred of its larvae on nettles on 9 August which confirms that there was a second emergence that autumn. The wall brown and speckled wood were in fair numbers there in the late summer of 1976. In 1977 the holly blue was common both in the spring and summer, but butterflies were much scarcer than in the previous year, and only one painted lady was noted. Mr Smith also reports many orange-tips *Anthocharis cardamines* (L.) on Bookham Common on 21 May 1977. During both years he records on the fringe of Wimbledon Common all the species already enumerated above for Surbiton, as well as the small heath and green-veined white.

In August 1976 Mr Peter King saw the speckled wood flying near Honor Oak and the comma at Streatham in October 1977.

Dr Geoffrey Beven reported a wealth of butterflies on Bookham Common during the remarkable summer of 1976, mainly from July onwards. In that month purple hairstreaks were especially numerous, as were gatekeepers *Pyronia tithonus* (L.) and ringlets *Aphantopus hyperantus* (L.) No less than six purple emperors were observed on the common between 30 June and 7 August, with others seen at nearby Ashted woods. It was a good year too for the white admiral, first noted on Bookham Common on 23 June, but what was phenomenal was one observed there on 5 September by Mr Hugh Baillie, doubtless a second emergence: seldom known to occur in the British Isles. The dark form *valezina* of the silver-washed fritillary *Argynnis paphia* (L.) was seen by Mr Alan Wheeler, a rarity for the Area, and a single white-lettered hairstreak was seen on 2 July 1976. For 1977 it was a much leaner picture. Two purple emperors were visitors to the insides of the cottages of Mr Alan Snow and of Mr Nigel Davies, the keepers on the common, one on 27 July, and the other



on 1 August. White admirals were first noticed on 11 July with 20 all told recorded by the keeper. A single holly blue was seen on 23 May 1977, and plenty of orange-tips during this same month.

Mrs P. O. Dunkley reports that in Banstead Woods on 28 May 1976 there were many orange-tips, speckled woods, a few peacocks, even the common blue, and a painted lady. In Nower Wood near Headley on 3 July there were no less than 12 white admirals, speckled woods and gatekeepers, accompanied by small skippers *Thymelicus sylvestris* (Poda) and the dark-green fritillary *Argynnis aglaja* (L.). On 27 July on Epsom Downs she saw a clouded yellow, one of two recorded for the Area in both years. In August and September she noticed three humming-bird hawkmoths *Macroglossum stellatarum* (L.) in her garden at Tadworth, where she had seen the comma in July.

In 1976 Mr E. H. Wild had some unusual visitors to his garden in Selsdon. Surprising was a high-brown fritillary feasting on his *Buddleja* on 9 July. This butterfly had not been recorded in this part of Surrey since the early 1950s and has died out from many of its former localities in southern England. The other records concern the moths of which over 1,000 a night came to his trap during the very hot spell at the end of June 1976. Several less common noctuids were unusually plentiful during this period. These included the large nutmeg *Apamea anceps* (Denis & Schiff.) the pale shining brown, the heart and club *Agrotis clavis* (Hufn.) with many fine varieties. The varied coronet was exceptionally numerous with a partial second brood. New visitors were the reddish-light arches *Apamea sublustris* (Esp.), a Webb's wainscot and an alder moth. An interesting geometer to grace his light-trap was the royal mantle *Catarhoe cuculata* (Hufn.). Melanism seems to have appeared in several species that summer, especially in the knot-grass with examples of f. *lugubris*, and a very dusky form *semivirga* of the miller *Acronicta leporina* (L.). Two outstanding captures were a convolvulus hawkmoth on 28 August, and on 19 July a unique aberration of the September thorn *Ennomos erosaria* (Denis & Schiff.) with the cross-bands much restricted. He also found a flourishing new colony of the small blue *Cupido minimus* (Fuess.) near Addington in August 1976.

In 1977 Mr Wild reports from Selsdon in March the tawny pinion of which a friend, Mr Chesney, saw no less than 12 on ivy at Kingswood the following October. Both the alder moth and Blair's pinion revisited him in 1977. An unexpected insect for his garden was the four-spotted *Tyta luctuosa* (Denis & Schiff.) now a scarce species everywhere. Another newcomer to his garden was the gatekeeper. Near Addington he watched a huge female oak eggar\* *Lasiocampa quercus* (L.) in the act of laying. There appears to be no previous authentic record of this moth in the Surrey part of the Area.

Mrs L. J. Delay reports finding the larva of the death's head hawkmoth *Acherontia atropos* (L.) feeding on jasmine in Putney in August 1976, while Mr Bernard Skinner recorded a great brocade *Eurois occulta* (L.), near Norwood on 9 September 1976, a rare visitor to the Area.

As in previous years Professor Sir John Dacic had some exceptional records from Wimbledon. His most interesting capture in 1976 was the silky wainscot *Chilodes martitima* (Tausch.) Another uncommon moth for his light-trap was the alder, not noted since 1956. In 1977 he had further brown-tails in it. Two marshland species were the tiny round-winged muslin and the southern wainscot *Mythimna straminea* (Treits.) on 21 August, while his first Blair's pinion came on 28 October. Among the geometers were the dwarf pug on 12 June and the

barred rivulet on 30 August, but the most outstanding visitor was the black-streaked pug on 15 September, denoting that this insect is steadily spreading inland. He also recorded six specimens of the least carpet in July and August 1977. At this period that year Mrs Shirley Bulpitt saw this little insect plentifully on shop windows at Elmer's End.

Towards the end of August 1977 Mr M. Kerley had the exceptional sighting of no less than 40 peacock butterflies feeding together on a large *Buddleja* in his garden at Warlingham.

From Addiscombe Mr Kenneth Evans reports a "Blair's night" on 8 October 1976 when simultaneously he saw Blair's pinion and Blair's mocha *Cyclophora puppillaria* (Hbn.) a species with very few previous records for the Area. Just a year later during the autumn migration in October 1977 he had two further rarities. One which visited his light-trap at Addiscombe on 22 October was the scarce bordered straw *Helicoverpa armigera* (Hbn.). This moth was accompanied by a host of the silver-Y moth *Plusia gamma* (L.) and the angle-shades *Phlogophora meticulosa* (L.). The other migrant taken in Nower Wood on 15 October near Headley was the delicate wainscot\* *Mythimna vitellina* (Hbn.), new to v.c. 17, with only three previous records for the Area.

As usual Mr P. J. Baker had plenty to report from Thorpe, especially for 1976 when he was getting nearly 5,000 moths a night in his mercury vapour light-trap at the end of June. Earlier on 5 May he noted the tawny shears *Hadena perplexa* (Denis & Schiff.), seldom seen in this locality. The 6 June was an early date for the rosy marbled. On 29 June there was another newcomer to his trap: the least carpet, which seems to be spreading right through Surrey. The beech hook-tip was yet another exceptional visitor. On 3 July he had the reddish light arches and the next night the wormwood shark *Cucullia absinthii* (L.) reappeared, being first seen there in 1975. A bedstraw hawkmoth was a notable record on 7 July, together with three dusky sallows. On 10 August he netted a male oak eggar *Lasiocampa quercus* (L.) in his garden, and that night the tiny maple pug came to his trap, another newcomer. The 15 August saw the crescent, not noted by him since 1970. The dusky lemon sawfly reappeared after three years, on 22 September, and on the 27th a convolvulus hawkmoth was attracted, also many merveille-du-jour during October 1976. Other unusual visitors to his greenhouse on 27 June 1976 were the small red-belted clearwing *Conopia myopaefornis* (Borkh.) and on 17 July the yellow-legged clearwing *Synanthedon vespiformis* (L.), both not seen before in his locality.

In spite of the lean season in 1977 Mr Baker had no less than five newcomers to his trap. After a spate of the lead-coloured drab *Orthosia populeti* (Fabr.) during March he was surprised to find 11 examples of the oak-tree pug *Eupithecia dodoneata* (Guen.) later that month, an early date for this insect which is usually associated with *Ilex*. But a greater prize on 3 July was a dotted rustic, with very few records for the Area. The heart moth *Dicycla oo* (L.) was another welcome arrival on 16 July as it has become scarce of late. A rare species for this district is the dark spectacle *Abrostola trigemina* (Wernb.) which came on 27 July, while a final surprise for the year was the delicate wainscot on 21 October, the second for Surrey. There were further merveille-du-jour in the autumn, a rare insect for the region in spite of a wealth of oak everywhere.

Mr C. B. Ashby records several moths uncommon to his district for 1977. They were seen in Nonsuch and Cheam Parks and include the small elephant hawkmoth *Deilephila porcellus* (L.) with two on 3 July, and two reddish light arches also in that month. In the autumn he had seven black rustics which is spreading in that area. Among the geometers the most noteworthy sighting



was the small waved umber *Horisme vitalbata* (Denis & Schiff.), always associated with *Clematis* traveller's joy. (In 1971, and again in 1973, Mr P. J. Baker recorded near Thorpe the archer's dart\*, hitherto not included in the Area list and therefore new to v.c. 17.)

### V.C. 18, South Essex

At least two Camberwell beauties were observed in 1976, one near Loughton on 7 September and another on 23 August near Ingrave reported by Mr G. Pyman.

As before Mr K. W. Grimwood has supplied an impressive list of moths seen in both years near Ingrave. In September 1976 he had a huge convolvulus hawk brought for inspection, and that autumn his first Blair's pinion\*, a newcomer to the vice-county. Among the more unusual visitors to light were the alder moth, the lobster *Stauropus fagi* (L.), the chocolate tip *Clostera curtula* (L.) and several cream-spot tigers *Arctia villica* (L.). The noctuids included the pale shining brown *Polia bonibycina* Hufn., Webb's wainscot *Archanara sparganii* (Esp.), the obscure wainscot *Mythimna obsoleta* (Hbn.), the slender brindle *Apamea scolopacina* (Esp.) and the merveille-du-jour. Geometers comprised the least carpet, the small emerald *Hemistola chrysoprasaria* (Esp.) and the sloe carpet *Aleucis distinctata* (H.-S.). In 1977 he saw the round-winged muslin *Thumatha senex* (Hbn.), the dog's tooth *Lacanobia suasa* (Denis & Schiff.), the rosy minor *Mesoligia literosa* (Haworth) and the starwort shark *Cucullia asteris* (Denis & Schiff.).

Mr P. J. Wanstall reports several newcomers to his trap run at Coxie Green regularly since 1972. In 1976 he had the rivulet *Perizoma affinitatum* (Stephens) on 25 May, the v-moth *Seniothisa wauaria* (L.) on 29 June, the brindled white-spot *Ectropis extersaria* (Hbn.) on 19 June, the peacock moth on 7 July, the white satin on 8 July, the fen wainscot *Arenostola phragmitidis* (Hbn.) and the dark scallop *Philereme transversata* (Hufn.) on 16 July. The spruce carpet\* *Thera variata* (Denis & Schiff.) came on 10 October. Near Shenfield a fine bedstraw hawkmoth was found in August by Mrs M. Panzetta. In 1977 the species included the pale brocade *Lacanobia w-latinum* (Hufn.), the dog's tooth in August, the wood carpet *Epirrhoe rivata* (Hbn.) in early July and several leopard moths on 13 July. On 4 April 1977 he had a tawny pinion\* in his light-trap and a least carpet as late as 29 October.

### V.C. 19, North Essex

There are no relevant records for the two years in this small part of the Area.

### V.C. 20, Herts.

No Camberwell beauties were reported from this vice-county in 1976. Mr Barry Goater has recorded a number of unusual visitors and uncommon species at his mercury vapour light-trap run in his garden at Bushey. The majority were seen in 1976. Newcomers included the brown scallop *Philereme vetulata* (Denis & Schiff.), a buckthorn feeder, also the least carpet *Idaea vulpinaria* (H.-S.), the sharp-angled carpet and the dusky swallow\* *Erenobia ochroleuca* (Denis & Schiff.). Other noteworthy species in 1976 were the alder moth *Acronicta alni* (L.) on 23 May, the lunar thorn *Selenia lunaria* (Denis & Schiff.) on 31 May, the leopard moth *Zeuzera pyrina* (L.) on 20 June, the satin moth on 30 June, also the blackneck *Lygephila pastinuum* (Treits.), the strawdot\* *Rivula sericealis* (Scop.) and the peacock moth\* *Seniothisa notata* (L.). Others were the twin-spot carpet *Perizoma didymata* (L.) on 2 July, the slender pug *Eupithecia tenuiata* (Hbn.) and the maple pug *E. inturbata* (Hbn.) with the



barred sallow on 20 September. Most of these dates are very early for the respective insects. In July 1977 Mr Goater had his second varied coronet *Hadena compta* (Denis & Schiff.). At the Haberdashers' Aske's School on 6 July 1976 he saw seven lunar pinions *Cosmia pyralina* (Denis & Schiff.), three specimens of the olive kidney *Ipinorpha subtusa* (Denis & Schiff.) and a melanic lesser lutestring *Ochropacha duplaris* (L.), also the dusky copper underwing *Amphipyra berbera* (Rungs), an early date for this insect. In July in this locality he had at light the small rufous wainscot *Coenobia rufa* (Haworth) and the scarce footman *Eilema complana* (L.), both uncommon in this region. At Hilfield Reservoir on 22 May he saw several small yellow underwings *Panemeria tenebrata* (Scop.) flying by day and found a colony of larvae of the osier hornet clearwing *Sphecia bembeciformis* (Hbn.) feeding in sallow stems, while in Broxbourne Wood in June 1977 he discovered borings in stems of *Viburnum* made by the larvae of the orange-tailed clearwing *Conopia anthraciniformis* Esp. These were originally recorded from this locality by the late Mr H. M. Edelsten in 1907.

Mr Goater also saw many butterflies on 9 May 1976 at Old Parkbury near Radlett. These included the green-veined white *Pieris napi* (L.), the small heath *Coenonympha pamphilus* (L.), and the small copper, a fairly early appearance for these insects, as it was too for the day-flying moths the mother shipton *Callistege mi* (Clk.) and the burnet companion *Enclidia glyphica* (L.). Mr Goater also draws attention to the increase in numbers and range of the white-lettered hairstreak *Strymonidia w-album* (Knoch). Apparently this butterfly with its larval pabulum being mainly on wych elm, is now well established in many other localities besides Whippendell Wood near Watford, its main headquarters in v.c. 20, despite Dutch elm disease.

As usual Mr Ian Lorimer has sent in a number of new records from his garden at Totteridge. Outstanding was a dotted rustic on 1 July 1976, and the melanic form *steinarti* of the alder moth, seldom noted for the Area. The brown-tail appeared for the first time on 3 July and the peacock moth on 2 July, which like the least carpet, seen on 8 July, was a newcomer to this part of the Area. The white-spotted pinion *Cosmia diffinis* (L.), another elm feeder, reappeared after many years. There were some select species in the autumn of 1976, including the black rustic *Aporophyla nigra* (Haworth). A melanic merveille-du-jour *Dichonia aprilina* (L.) appeared on 13 October and a Blair's pinion on 2 October. Two other local rarities were the tawny pinion *Lithophane sentibrunnea* (Haworth) and the pale lemon sallow *Xanthia ocellaris* (Borkh.), both on 30 September. A melanic example of the double-lobed *Apamea ophiogramma* (Esp.) was another scarce variety to arrive in July. Mr Lorimer also mentions large numbers of certain insects at light in 1976, such as 100 Vine's rustic on the night of 25 August. During 1977 there were further brown-tails and several stout darts *Spaelotis ravida* (Denis & Schiff.) in mid-September, also the first large thorn\* *Ennomos autumnaria* (Wernb.) for the trap arrived on 26 September, and a dusky-lemon sallow *Xanthia gilvago* (Denis & Schiff.) on 15 October, though there was no elm, its larval pabulum, in the vicinity.

In that phenomenal year, 1976, Mr Lorimer also reports several abnormal appearances in his light-trap as regards dates, indicating most probably second brood emergences. Among these were the green silver-lines *Bena prasinana* (L.) on 22 September when he also saw the varied coronet, while the ribband wave *Idaea aversata* (L.) and the foxglove pug both came on 28 September.

From Rickmansworth in 1976 Mr G. Prior records Haworth's pug\* *Eupithecia haworthiata* Doubleday, a *Clematis* feeder, apparently new to Hertfordshire.

**V.C. 21, Middlesex**

Foremost for this vice-county during 1976 are three records of Camberwell beauties, of which all sightings in the Area are enumerated in a comprehensive paper by Mr Chalmers-Hunt in *Entomologist's Rec. J. Var.* 89 : 89-105, 248-249 (1977). One of the earliest noted was on 9 July seen feeding on a spray of *Buddleja* just north of Brentford High Street by Mr P. J. Edwards. On 21 August Mrs Jean Rabjohn saw this fine butterfly sail down from a high willow and settle on some *Dalilia* buds near Northwood, while at Ealing on 10 September Mrs C. Lee observed yet another on *Buddleja* about noon.

Mr R. A. Softly has sent some interesting records from Hampstead Heath where he found a flourishing colony of the Essex skipper in 1975 and again in 1976. This local insect seems to be getting more common in the Area. Hampstead Heath provided plenty of holly blues in 1976 with their larvae later found on ivy buds. The common blue *Polyommatus icarus* (Rott.) was also numerous there that year, as was the comma and also larval tents of the painted lady on thistles. Among moths seen in both years on Hampstead Heath were many specimens of the oak hook-tip *Drepana binaria* (Hufn.), the chimney sweep *Odezia atrata* (L.) and the seraphim *Lobophora halterata* (Hufn.). In 1977 Mr Softly found a pair of the white satin *Leucoma salicis* (L.) on 19 July, and a single brown-tail on a fence on 2 July. Two larvae of the puss moth *Cerura vinula* (L.) were found in 1977 and a pale engrailed *Ectropis crepuscularia* (Denis & Schiff.) on 14 May of that year. Hardly any of the species mentioned above appear in *Hampstead Lepidoptera* (1913) by Dr Brian Ellisdon, though it contains a long list of species.

It was on the hot night of 28 June 1976 that, with a host of other insects, there appeared a sand dart\* *Agrotis ripae* (Hbn.) in the light-trap run by the Rev. David Agassiz in his garden at Enfield, a long way from its normal habitat on the Essex coastal sand-hills. This species, not recorded before for the Area, may well have been borne inland on air currents. Also in this hot period on 25 June 1976 Mr Christopher Holme had a female leopard moth alight inside his house in daytime near Swiss Cottage.

Mr P. J. Edwards, besides the Camberwell beauty seen at Brentford, also reports three other unusual butterflies for Middlesex. On 27 July 1975 in Perivale Wood Nature Reserve he saw a marbled white *Melanargia galathea* (L.). On 18 July 1976 he watched a grayling *Hipparchia semele* (L.) close to Hanwell, only previously reported from Hounslow Heath and Ruislip. The next day, 19 July, he observed a purple hairstreak *Quercusia quercus* (L.), also in Perivale Wood Reserve, only noted before from Ruislip and Northwood.

Mr Barry Goater records a number of species seen at light during two visits to Bishop's Wood, Harefield, in May 1977. The more noteworthy include the beech hook-tip *Drepana cultraria* (Fab.), only recorded from Ruislip and Hampstead. Among geometers were the dwarf pug *Eupithecia tantillaria* Boisd. and the foxglove pug *E. pulchellata* Stephens. Other species included the pale prominent *Pterostoma palpina* (Clerck), the iron prominent *Notodonta dromedarius* (L.), the purple thorn *Selenia tetralunaria* (Hufn.) and the pale oak beauty *Serraca punctinalis* (Scop.).

Mr J. P. Widgery reports from his garden at Potters Bar in 1976 the purple hairstreak, a surprising visitor. Among the moths there were the dusky sawfly *Eremobia ochroleuca* (Denis & Schiff.). The white satin was another unexpected arrival, as were the large marbled tortrix *Nycteola revayana* (Scop.), the sharp-angled carpet *Euphyia unangulata* (Haworth) and the barred sawfly *Xanthia aurago* (Denis & Schiff.).

In 1977 the most important visitor to his garden was the dotted rustic\* *Rhyacia simulans* (Hufn.) in August. Other records for his trap in that month included the purple clay *Diarsia brunnea* (Denis & Schiff.), the straw underwing *Thalpophila matura* (Hufn.), the crescent *Celaena leucostigma* (Hbn.), the herald *Scoliopteryx libatrix* (L.) and surprisingly in July the large red-belted clearwing\* *Aegeria culiciformis* (L.), a newcomer for v.c. 21, whose larvae feed in birch stumps.

Mr G. Prior noted the cypress pug *Eupithecia intricata arceuthata* (Freyer) from Harrow where he also saw the mottled pug *E. exigua* (Hbn.), both in 1977. On 27 October of that year Mrs Philippa Lowe found a red swordgrass *Xylena vetusta* (Hbn.) in Hampstead Garden Suburb, a moth seldom recorded in the Area. In August of that year Garry Bean saw a large moth hovering at dusk in his garden at Feltham; it turned out to be a female spurge hawk\*, not known before in Middlesex, and a rare migrant. On 31 August Mr P. W. Cribb observed on Hounslow Heath several painted ladies at rest; this was at 7.00, but by afternoon all had disappeared, no doubt part of a big migration.

#### V.C. 24, Bucks.

There are no recent records for this small portion of the Area since the chief recorder, Sir Eric Ansorge, died at Chalfont St Peter early in 1977.

The total species of macrolepidoptera for the Area now stands at 737, which is equivalent to 78% of the 942 species recognised as valid for the British Isles at the end of 1977.



# Amphibia and Reptilia in the London Area 1977

by D. G. HALL\*

## AMPHIBIA

SMOOTH NEWT *Triturus vulgaris* (L.)

SURREY. Bookham Common.

PALMATE NEWT *Triturus helveticus* (Razoumowsky)

SURREY. Bookham Common.

CRESTED NEWT *Triturus cristatus* (Laurenti)

SURREY. Bookham Common.

COMMON FROG *Rana temporaria* L.

MIDDX. Hampstead Heath.

SURREY. Bookham Common; Esher.

MARSH FROG *Rana ridibunda* (Pallas)

SURREY. One by the River Thames at Kew Gardens.

COMMON TOAD *Bufo bufo* (L.)

SURREY. Bookham Common.

## REPTILIA

COMMON LIZARD *Lacerta vivipara* Jacquin

ESSEX. South Ockendon.

GRASS SNAKE *Natrix natrix* (L.)

ESSEX. Sewardstonebury.

MIDDX. Potters Bar.

SURREY. Bookham Common.

ADDER *Vipera berus* (L.)

MIDDX. Coppett's Wood, Barnet.

\* Deceased May 1978.

# Mammals in the London Area 1976

by D. G. HALL\*

The checklist numbers are from G. B. Corbet's *The Identification of British Mammals*, Ed. 2 (1969).

## INSECTIVORA

### 1. HEDGEHOG *Erinaceus europaeus* L.

Nearly all the records received were from the usual localities.

ESSEX. Epping Forest (Great Monk Wood); Gidea Park; Hobbs Cross; Hornchurch; Romford; Sewardstonebury.

HERTS. Rickmansworth.

INNER LONDON. Hyde Park; Kensington Gardens.

KENT. Chislehurst; Eltham; Kidbrooke; Orpington.

MIDDX. Bush Hill Park; Chiswick; Ealing; Enfield; Greenford; Harrow; Hatch End; Kenton; Kilburn; Pond Wood Reserve; Potters Bar; Ruislip; Turnham Green; Wrotham Park.

SURREY. Anerley; Barn Elms; Cheam; Coulsdon; East Sheen; Esher; New Malden; Petersham; Purley; Sutton; Wandsworth; Wimbledon.

### 2. MOLE *Talpa europaea* L.

KENT. Petts Wood; Westerham.

MIDDX. Barn Hill; Bentley Priory; Harrow Weald Common; Horsendon Hill; Pond Wood Reserve; Stockers Lake.

SURREY. Bookham Common.

### 3. COMMON SHREW *Sorex araneus* L.

ESSEX. Sewardstonebury; Walthamstow Reservoirs.

HERTS. Cheshunt.

KENT. Westerham.

MIDDX. Barn Hill.

SURREY. Chipstead; Wimbledon Common.

### 4. PYGMY SHREW *Sorex minutus* L.

KENT. Eynsford; Ruxley Gravel-pit; Westerham.

MIDDX. Harrow Weald.

## CHIROPTERA

Only bats identified in the hand are reported.

### 19. PIPISTRELLE *Pipistrellus pipistrellus* (Schreber)

INNER LONDON. Hyde Park.

KENT. Westerham.

\* Deceased May 1978.

## CARNIVORA

24. FOX *Vulpes vulpes* (L.)

About the same number of records were received as in 1975.

ESSEX. Havering.

HERTS. Cheshunt; Waltham Cross.

KENT. Beckenham; Bickley; Biggin Hill; Chelsfield; Chislehurst; Cudham; Dartford; Farnborough; Green Street Green; Keston; Kidbrooke; Locks Bottom; Northfleet; Orpington; Otford; Petts Wood; St Mary Cray; Sidcup; Swanley; Thamesmead; Westerham; Woolwich.

MIDDX. Ealing; Enfield; Harrow; Harrow Weald Common; Hatch End; Pinner; Pond Wood Reserve; Ruislip; Stockers Lake.

SURREY. Barn Elms; Bookham; Christchurch Park; Coulsdon; Esher; Headley; Long Ditton; New Malden; Norwood; Purley; Sanderstead; Sutton; Upper Gatton Wood; Wandsworth; Wimbledon.

27. STOAT *Mustela erminea* L.

ESSEX. Loughton.

MIDDX. Bentley Priory.

SURREY. Bookham Common.

28. WEASEL *Mustela nivalis* L.

HERTS. Cheshunt.

KENT. Knockholt.

MIDDX. Enfield; Hatch End; Pinner.

SURREY. Bookham Common; Walton Heath.

31. BADGER *Meles meles* (L.)

KENT. Bromley Common; Farnborough; Keston; Pratts Bottom; Petts Wood.

MIDDX. Pond Wood Reserve; Wrotham Park.

SURREY. Selsdon; Woldingham.

## ARTIODACTYLA

44. FALLOW DEER *Dama dama* (L.)

MIDDX. Droppings observed in Pond Wood Reserve.

45. ROE-DEER *Capreolus capreolus* (L.)

SURREY. Bookham Common; Box Hill; Little Woodcote; Norbury Down.

47. CHINESE MUNTJAC *Muntiacus reevesi* (Ogilby)

HERTS. Broxbourne Woods.

MIDDX. Enfield; Harrow Weald; Hatch End; Pond Wood Reserve.

## LAGOMORPHA

53. BROWN HARE *Lepus capensis* L.

ESSEX. Chingford; Copped Hall; Epping Green; Walthamstow.

MIDDX. Colne valley; Harrow College; Harrow Weald; King George VI Reservoir.

SURREY. Bookham Common; Walton Downs.



55. RABBIT *Oryctolagus cuniculus* (L.)

Not so well recorded as in previous years.

ESSEX. Brentwood; Copped Hall; Harold Wood; Navestock (with myxomatosis); Sewardstonebury; Upshire.

HERTS. Broad Colney; Essendon; Hadley Wood; Hatfield; How Green; Lee Gravel-pit; Northaw; North Mymms; Panshanger.

INNER LONDON. Hyde Park; Kensington Gardens.

KENT. Green Street Green; Orpington; Otford; Ruxley Gravel-pit; Shoreham; Thamesmead; Westerham.

MIDDX. Bentley Priory; Bushy Park; Hampstead Heath (evidence in owl pellet); Horsendon Hill; Pinner; Staines Reservoir; Stanmore; Wrotham Park.

SURREY. Bookham Common; Carshalton; Druids' Grove; Mickleham; Upper Gatton Wood.

## RODENTIA

57. GREY SQUIRREL *Sciurus carolinensis* Gmelin

Not so well recorded as in 1975.

ESSEX. Buckhurst Hill; Copped Hall; Loughton; Sewardstonebury.

HERTS. Broxbourne; Letty Green; Mardon Hill; Panshanger.

INNER LONDON. Hyde Park; Kensington Gardens.

KENT. Abbey Wood; Beckenham; Brasted; Bromley Common; Chelsfield; Chislehurst; Farnborough; Greenwich; Kelsey Park; Kidbrooke; Knockholt; Orpington; Otford; Petts Wood; Repository Wood, Woolwich; Westerham.

MIDDX. Edmonton; Bishop's Park, Fulham; Greenford; Harrow (not so common); Pymms Park; Pond Wood Reserve; Potters Bar; Trent Park; Wrotham Park.

SURREY. Barn Elms; Berrylands; Bookham Common; Burhill golf-course; Carshalton Ponds; Christchurch Park; Cobham; Coulsdon; Epsom Common; Esher; Hersham; Morden; New Malden; Richmond Park; Wimbledon Common.

59. DORMOUSE *Muscardinus avellanarius* (L.)

SURREY. By 1965 the species was so rare that details were not published. Evidence that it is still present in the London Area is based on a report by Dr D. W. Yalden of Manchester University on gnawed hazelnuts in Norbury Park.

62. WOOD-MOUSE *Apodemus sylvaticus* (L.)

ESSEX. Sewardstonebury.

KENT. Eltham; Greenwich Park; Orpington; Repository Wood; Shooters Hill; Westerham.

MIDDX. Barn Hill; Kenton; Pond Wood Reserve; Potters Bar.

64. HOUSE-MOUSE *Mus musculus* L.

Common in the London Area.

66. BROWN RAT *Rattus norvegicus* (Berkenhout)

Common in the London Area.

67. BANK-VOLE *Clethrionomys glareolus* (Schreber)

KENT. Westerham.

MIDDX. Barn Hill.

SURREY. Bookham Common.

68. WATER-VOLE *Arvicola terrestris* (L.)

ESSEX. Fishers Green; Walthamstow Reservoirs.

HERTS. River Colney, Colney Heath.

KENT. Thamesmead; Westerham.

MIDDX. Pond Wood Reserve.

SURREY. Mickleham.

69. FIELD-VOLE *Microtus agrestis* (L.)

ESSEX. Navestock.

KENT. Eltham; Orpington.

MIDDX. Barn Hill; Greenford; Hampstead Heath; Pond Wood Reserve.

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## Book Review

*The Observer's Book of Lichens.* By Kenneth L. Alvin. 188 pp, 53 colour illustrations + 109 black and white photographs and diagrams. [Edition 2]. Frederick Warne, London. 1977. £1.10.

Warne's Observer's Pocket Series are amongst the best known books for providing an introduction to diverse subjects ranging from zoo animals to churches and from fly fishing to manned spaceflight. Their profusion of good, if small, illustrations, low cost and wide availability makes them especially attractive to beginners, particularly school children and students. Many of today's experts started with a book in this series.

The first *Observer's Book of Lichens*, by Alvin and Kershaw, was published in 1963 but became out of print 10 years later. At first Warne's were hesitant to provide a new edition, presumably because of low demand. However the growing widespread interest in lichens as environmental indicator plants has evidently persuaded them to change their views, and a new edition has now appeared. The book has a useful introduction to the biology of lichens, followed by keys to life-forms and genera, with descriptions and illustrations of individual species.

This second edition has been extensively revised. The text has been largely rewritten and many new drawings by Claire Dalby have been incorporated. The illustrations are now mostly excellent and the text reliable, virtually free from errors, and up-to-date. As there are about 1400 lichen species in the British Isles a book of this size cannot cover them all, and a selection has had to be made. 174 species have been incorporated, but unfortunately a number of very common stone-dwelling lichens have been omitted. There is, for example, no mention of *Candelariella aurella*, one of the most abundant urban species, which many purchasers of the book should find growing in their gardens. No mention either of *C. medians*, *Caloplaca teicholyta*, *Verrucaria nigrescens* and other common churchyard lichens. Yet we find reference to a number of much less common plants, *Parmelia reddenda* and both species of *Rocella*, for example. As much lichen work by students is now done in churchyards and polluted areas, this unfortunate choice of species has made the book less useful than should have been the case. Selection apart, the book is strongly recommended. It is well edited, printed and bound. Prospective purchasers should not be deterred by the statement on the dust-jacket that the modest author is "not primarily a lichenologist".

# Mammals in the London Area 1977

by D. G. HALL\*

The checklist numbers are from G. B. Corbet's *The Identification of British Mammals*, Ed. 2 (1969).

## INSECTIVORA

1. HEDGEHOG *Erinaceus europaeus* L.  
 ESSEX. Loughton; Sewardstonebury.  
 HERTS. London Colney; Newgate Street.  
 KENT. Dulwich; Eynsford; Mottingham; Petts Wood; St Mary Cray.  
 MIDDX. Enfield; Tottenham.  
 SURREY. Bookham Common; Cobham; Coulsdon; Esher; Great Bookham; Smitham, Purley; Sutton; Wimbledon.
2. MOLE *Talpa europaea* L.  
 MIDDX. Bones in a tawny owl's pellet on Hampstead Heath.
3. COMMON SHREW *Sorex araneus* L.  
 ESSEX. Sewardstonebury.  
 MIDDX. Hampstead Heath.

## CARNIVORA

24. FOX *Vulpes vulpes* (L.)  
 ESSEX. Copped Hall Green.  
 KENT. Chelsfield; Chislehurst; Orpington; Petts Wood; Thamesmead.  
 MIDDX. Ealing.  
 SURREY. Barn Elms; Bookham Common; Buckland; Christchurch Park; Coulsdon; Esher; Mitcham Junction; railway line near Wandsworth Prison; Wimbledon.
28. WEASEL *Mustela nivalis* L.  
 HERTS. Cuffley.  
 MIDDX. Perivale.  
 SURREY. Bookham Common.
31. BADGER *Meles meles* (L.)  
 SURREY. Bookham Common; Esher; Headley; Selsdon; Wimbledon.

## ARTIODACTYLA

45. ROE-DEER *Capreolus capreolus* (L.)  
 SURREY. Bookham Common; Nower Wood.
47. CHINESE MUNTJAC *Muntiacus reevesi* (Ogilby)  
 HERTS. Broxbourne.

\* Deceased May 1978.



## LAGOMORPHA

53. BROWN HARE *Lepus capensis* L.  
SURREY. Bookham Common.
55. RABBIT *Oryctolagus cuniculus* (L.)  
ESSEX. Upshire.  
HERTS. Letty Green; Northaw Great Wood.  
KENT. Knockholt; Shoreham; Thamesmead.  
MIDDX. Bone in tawny owl's pellet on Hampstead Heath.  
SURREY. Bookham Common; Buckland; Staines Reservoir.

## RODENTIA

57. GREY SQUIRREL *Sciurus carolinensis* Gmelin  
ESSEX. Chingford; High Beach; Sewardstonebury.  
HERTS. Archers Green; Broad Riding Wood; Little Berkhamsted.  
KENT. Bickley; Chelsfield; Chislehurst; Dulwich Woods; Green Street Green; Greenwich; Kidbrooke; Lesnes Abbey Wood; Orpington; Petts Wood; Pratts Bottom.  
MIDDX. Bishop's Park, Fulham.  
SURREY. Christchurch Park; Cobham; Coulsdon; Esher; Hampton; Morden Hall Park; Wallington; Wimbledon.

59. DORMOUSE *Musccardinus avellanarius* (L.)  
SURREY.

In February 1977 a male dormouse was found in its nest by an oak tree on Bookham Common. It was cared for by the Keeper and released in May. See the 1976 report for the evidence of this species from a neighbouring area.

62. WOOD-MOUSE *Apodemus sylvaticus* (L.)  
ESSEX. Sewardstonebury.  
KENT. Dulwich Wood.  
MIDDX. Bones found in several tawny owl pellets on Hampstead Heath.  
SURREY. Christchurch Park.

64. HOUSE-MOUSE *Mus musculus* L.  
Common in the London Area but few records received from members.

66. BROWN RAT *Rattus norvegicus* (Berkenhout)  
Common in the London Area but few records received from members.

68. WATER-VOLE *Arvicola terrestris* (L.)  
KENT. Erith Marshes.  
SURREY. Bookham Common.

69. FIELD-VOLE *Microtus agrestis* (L.)  
ESSEX. Sewardstonebury.  
MIDDX. Bones found in several tawny owl pellets on Hampstead Heath.  
SURREY. Bookham Common.

## Statement of Affairs

1976

## Premises and Equipment Fund (incorporating the Hindson and Castell bequests)

63,666	Balance at 1 November 1976 .. .. .	67,870
223	Add: Bank deposit interest .. .. .	253
73	Other deposit interest .. .. .	38
2,789	Investment income received .. .. .	3,163
1,625	Income tax recovered .. .. .	2,869
57	Profits less losses on sales of investments ..	1,338
4,767		7,661
366	Less: Custodian's charges .. .. .	452
4,401		7,209
68,067		75,079
196	Less: Grant to general account .. .. .	251
67,871		74,828

## Life Composition Account

200	Balance at 1 November 1976 .. .. .	200
-----	------------------------------------	-----

## Other Reserves

## Library cataloguing fund:

99	Balance at 1 November 1976	99
1,400	London Naturalist reserve .. .. .	1,750
2,850	London Bird Report reserve .. .. .	1,750
—	London bird atlas reserve .. .. .	1,000

## Plant mapping scheme: research and publication fund:

275	Balance at 1 November 1976 .. .. .	269
6	Less: Transfer to general account .. .. .	57
269		212
4,618		4,811

## Accumulated Fund

—	Balance, deficit, brought forward .. .. .	(2,335)
(2,335)	Deficit for year—general account .. .. .	( 313)
(2,335)		(2,648)
£70,354		£77,191

## at 31 October 1977

1976

## Assets

64,516	Quoted Investments at cost .. .. .	70,408
	(Market value £83,503)	

## Funds at Bank and on Deposit

1,500	No. 1 deposit account .. .. .	—
3,241	No. 2 deposit account .. .. .	—
—	Investment deposit account .. .. .	1,250
—	National Savings deposit account .. .. .	3,000
866	Cash capital .. .. .	602
11	Cash income .. .. .	89
220	Current account .. .. .	1,739
		<hr/>
		6,680
—	Cash in hand .. .. .	103
5,838		

Report of the Auditors to the Members of  
the London Natural History Society

We have verified the accounts with the books and records of the Society and certify them to be in accordance therewith.

Knightway House,  
20 Soho Square,  
LONDON W1V 6QJ  
2 December 1977

NORTON KEEN & CO.  
Chartered Accountants



## General

1976	Payments										
512	Hire of halls, etc.	..	..	..	..	..	..	..	..	..	384
107	Lecturers' fees and expenses	..	..	..	..	..	..	..	..	..	47
298	Sectional expenses including LNCC	..	..	..	..	..	..	..	..	..	251
400	Printing and stationery	..	..	..	..	..	..	..	..	..	165
153	Library	..	..	..	..	..	..	..	..	..	214
20	Castell research centre	..	..	..	..	..	..	..	..	..	—
340	Honoraria	..	..	..	..	..	..	..	..	..	430
181	Postage and telephone	..	..	..	..	..	..	..	..	..	152
36	Sundries	..	..	..	..	..	..	..	..	..	33
23	Equipment repairs and renewals	..	..	..	..	..	..	..	..	..	37
256	Cost of services (auditor's fees, bank charges, insurance, etc.)	..	..	..	..	..	..	..	..	..	137
100	Publicity	..	..	..	..	..	..	..	..	..	48
3,579	Grant to publications' account	..	..	..	..	..	..	..	..	..	3,755
£6,005											£5,653

## Publications.

438	<i>Programme</i>	..	..	..	..	..	..	..	..	..	..	278
1,400	<i>London Naturalist 55</i> reserve	..	..	..	..	..	..	..	..	..	..	—
—	<i>London Naturalist 56</i> reserve	..	..	..	..	..	..	..	..	..	..	1,750
1,500	<i>London Bird Report 40</i> reserve	..	..	..	..	..	..	..	..	..	..	—
—	<i>London Bird Report 41</i> reserve	..	..	..	..	..	..	..	..	..	..	1,750
—	London bird atlas reserve											1,000
589	<i>Bulletin</i>	..	..	..	..	..	..	..	..	..	..	783

[illegible]

198	Sale of publications .. .. .	363
19	<i>Bulletin</i> income .. .. .	17
3,579	Transfer from general account .. .. .	3,755
131	<i>London Naturalist</i> 54 (excess reserve over expenditure) .. .. .	—
—	<i>London Naturalist</i> 55 (excess reserve over expenditure) (£1,400—£1,174) .. .. .	226
—	<i>London Bird Report</i> 39 (excess reserve over expenditure) (£1,350—£1,177) .. .. .	173
—	<i>London Bird Report</i> 40 (excess reserve over expenditure) (£1,500—£1,497) .. .. .	3
—	London bird atlas .. .. .	1,024
£3,927		£5,561









## Instructions to Contributors

### Submission of papers

Papers relevant to the natural history and archaeology of the London Area should be submitted to the editor, Mr J. R. Laundon, Department of Botany, British Museum (Natural History), Cromwell Road, London SW7 5BD, before the end of January if they are to be considered for publication in the same year. They should be typed, with double spacing and wide (three cm) margins, on one side of the paper. Authors must retain a duplicate copy. Papers should include at the beginning an abstract, summary or synopsis.

### Text

Spellings are to follow *Chambers Twentieth Century Dictionary* 1972 edition; locality spellings should follow the latest editions of the maps published by the Ordnance Survey. Capitalisation should be kept to a minimum. Common names of animals and plants must begin with lower-case initials, and scientific names must be underlined. When both common and Latin names are given there should be no brackets or commas separating them. Genus names should appear in full where first used within each paragraph. In descriptive matter numbers under 10 should be in words, except in a strictly numerical context. Dates should follow the logical sequence of day, month, year (i.e. 25 December 1971). Measurements should be in metric and follow the SI system (Système International d'Unités), with imperial equivalents in parentheses where appropriate. There should be no full point following Dr, Mr, Mrs or St. Lists should be in natural, alphabetical or numerical order.

### References

Reference citation should be based on the Madison rules (in *Bull. Torrey bot. Club* 22 : 130-132 (1895)) except that a colon should always precede a page number. Capitalisation in titles of papers in journals should be kept to a minimum. Journal titles should follow the abbreviations in the *World List of Scientific Periodicals* and be underlined. Examples are as follows:

In text:

Meadows (1970 : 80). (Meadows 1970).

In references:

MEADOWS, B. S. 1970. Observations on the return of fishes to a polluted tributary of the River Thames 1964-9. *Lond. Nat.* 49 : 76-81.

MELLANBY, K. 1970. *Pesticides and Pollution*. Ed. 2. Collins, London.

WHITE, K. G. 1959. Dimsdale Hall moat, part II. *Trans. a. Rep. N. Staffs. Fld Club* 92 : 39-45.

### Illustrations

Distribution maps should be submitted in the form of a Recording Map with symbols in Indian ink or Letraset. Solid dots are used to indicate contemporary or recent presence, circles for old records and crosses (not pluses) for other information, such as introduced species. Tetrad dots and circles should be 4.0 mm and tetrad crosses 5.0 mm, with a line thickness of 0.8 mm; all monad symbols should be 1.6 mm with a line thickness of 0.5 mm. The legend should be written outside the frame of the map and will be set up by the printer. The Mapping Schemes Secretary can provide Recording Maps, advice and dies for printing distribution symbols.

Line drawings should be in Indian ink on Bristol board, preferably twice the printed size. Place names, etc., must be produced with stencils or Letraset. Legends should be separate as they will be set up by the printer.

Photographs should be glossy black-and-white prints, of good contrast, preferably half-plate in size.

### Proofs

Galley proofs will be sent to authors for scrutiny, but only essential corrections can be made at that stage.

### Reprints

Up to twenty-five free reprints will be supplied on request. Additional copies may be purchased if ordered when the proofs are returned.



# The London Naturalist

No. 57

1978

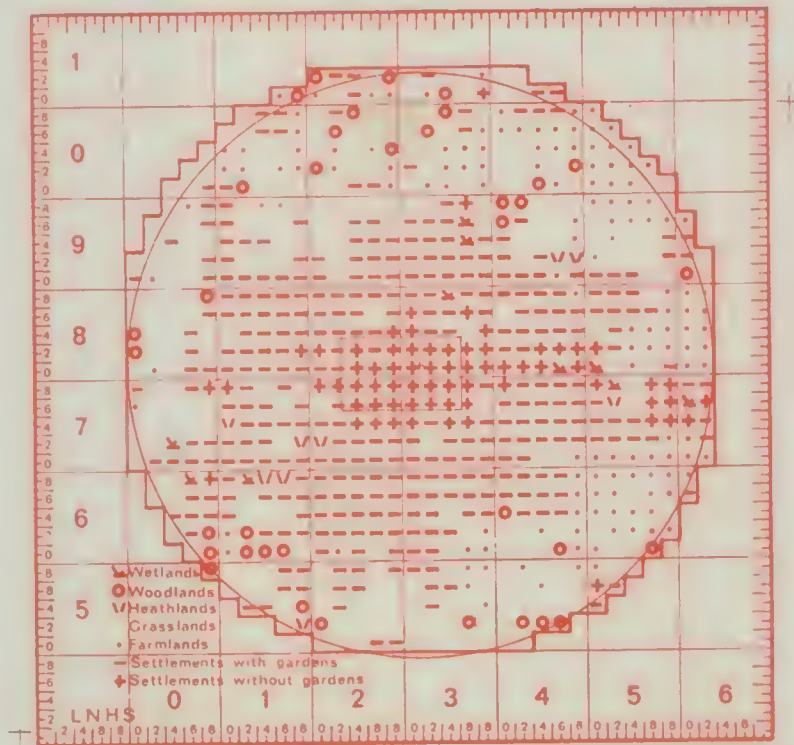
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# HABITAT

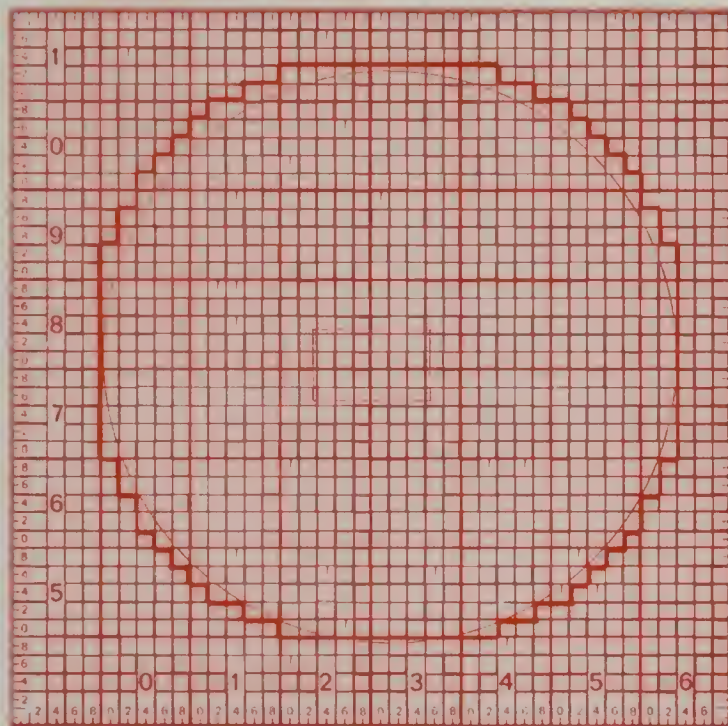


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# MASTER GRID



U.S. Navy



Surveyed by the LNHS  
Based on C.P. Castell 1942

15 M37

